

PUBLIC HEALTH REPORTS

VOL. 53

APRIL 22, 1938

NO. 16

FREQUENCY OF SURGICAL PROCEDURES AMONG 9,000 FAMILIES, BASED ON NATION-WIDE PERIODIC CEN- VASSES, 1928-31¹

By SELWYN D. COLLINS, Principal Statistician, United States Public Health Service

CONTENTS

| | Page |
|--|------|
| I. Source and character of data..... | 589 |
| II. Frequency of surgical procedures in the whole group observed..... | 590 |
| III. Variation in the frequency of surgical procedures with economic status..... | 602 |
| IV. Variation in the frequency of surgical procedures with size of city and geographic area..... | 607 |
| V. Severity and medical care of surgical cases..... | 616 |
| VI. Summary..... | 626 |
| VII. References..... | 627 |

Surgical treatment of wounds and fractures and of external parts of the body was practiced even in ancient times (17). In the Middle Ages many minor operations were performed by barbers and some major operations were done by surgeons (16, p. 118). However, infection following the operation was the rule rather than the exception. The extensive use of surgery involving the internal organs came only after two other developments; namely, the successful use of anesthetics and particularly the development of aseptic procedures (15, p. 13). Joseph Lister, the great English surgeon, first used antiseptic methods in 1865 (13, p. 71); modern aseptic surgical procedures, however, are vastly different from Lister's epoch-making beginnings.²

Even with these improvements, surgery was slow to spread beyond the caring for lacerations, wounds, and fractures where any sort of surgical procedure was better than none. Maes (14) states that 60

¹ From Statistical Investigations, Division of Public Health Methods, National Institute of Health.

This is the eleventh of a series of papers on sickness and medical care in this group of families (1-10). The survey of these families was organized and conducted by the Committee on the Costs of Medical Care; the tabulation was done under a cooperative arrangement between the Committee and the Public Health Service. Committee publications based on the results deal primarily with costs and Public Health Service publications primarily with the incidence of illness and the extent and kind of medical care, without regard to cost. As costs are meaningless without some knowledge of the extent and nature of the service received, there is inevitably some overlapping. The committee staff, particularly Dr. I. S. Falk and Miss Margaret Clem, cooperated in the tabulation of the data.

Special thanks are due to Dr. Mary Gover, who assisted in the analysis, to Mrs. Lily Vanzee Welch, who was in immediate charge of tabulating the data, and to other members of the statistical staff of the Public Health Service for advice and assistance in the preparation of the study.

² It has been said that Semmelweis' theory of contact infection formulated in 1847 is the basis of present day aseptic technique. Lister's work, however, was the first application of antiseptic methods to surgery. See Weekly Bulletin of the New York City Department of Health, vol. 18, p. 66, March 2, 1929.

years ago practically all operations were of an emergency nature, undertaken with little hope of success and only because death was inevitable under any circumstances.

According to Matas (15, p. 13), Charity Hospital in New Orleans in 1881 had 172 surgical operations among 5,309 admissions, or 3.2 percent of the total cases. Two-thirds of the 172 operations were of an emergency character, 72 being amputations, 23 incisions for abscess, and 18 extractions of bullets. Only one was an abdominal operation. This showing may be contrasted with the record for the same hospital in 1923 when there were 16,405 operations among the 20,565 admissions, or 79.8 percent of the total cases.

The number of physicians specializing in surgery and the number of major as well as minor operations have increased greatly in the present century. United States Army and Navy records indicate that there are now about twice as many operations per 1,000 men in those organizations as in 1910; that there are nearly three times as many appendectomies; and that there are approximately 10 times as many tonsillectomies per 1,000 men as in 1910.³

Questions are frequently asked about the annual number of surgical operations of all or of specific kinds in the United States. Such queries have not been answered even by estimates, because it is impracticable to secure from all doctors and hospitals in any sample area records of the number of operations performed; when individual physicians or hospitals attempt to answer the question from their own records, they have no population to which the operations can be related for the computation of rates. If data were collected on surgical operations from all hospitals in a given city or State, they would include

³ Surgical operation rates in the U. S. Army and the U. S. Navy in 2 periods were as follows:

| Years | Annual operation rate per 1,000 | | | | | Number of operations | | | | | Population (person-years of life observed) |
|-------------|---------------------------------|---------------|--------------|-----------------------|-------------------|----------------------|---------------|--------------|-----------------------|-------------------|---|
| | All operations | Tonsillectomy | Appendectomy | Hemorrhoid operations | Hernia operations | All operations | Tonsillectomy | Appendectomy | Hemorrhoid operations | Hernia operations | |
| U. S. Navy | | | | | | | | | | | |
| 1908-12.... | 66.9 | 2.0 | 5.1 | 3.2 | 5.1 | 19,510 | 573 | 1,483 | 947 | 1,481 | 291,721 |
| 1933-35.... | 109.5 | 27.9 | 13.7 | 4.3 | 4.8 | 36,313 | 9,254 | 4,550 | 1,418 | 1,604 | 331,754 |
| U. S. Army | | | | | | | | | | | |
| 1908-12.... | 50.6 | 3.1 | 3.1 | 3.4 | 2.5 | 20,834 | 1,260 | 1,273 | 1,389 | 1,039 | 411,500 |
| 1933-35.... | 121.6 | 21.7 | 10.1 | no data | 3.9 | 50,330 | 8,995 | 4,166 | no data | 1,624 | 413,775 |

The number of operations in the Navy in 1909 was increased 42 percent by 1,638 operations on boils that occurred as an "epidemic" on the battleship *Pennsylvania*; if these are deducted from the total the average annual rate for all operations for the period 1908-12 is 61.3 per 1,000 instead of 66.9.

Tonsillectomy includes operations in which both the tonsils and adenoids were removed but does not include adenoidectomy alone.

Operations by Army and Navy doctors on nonservice personnel are excluded in the period 1933-35 for both services; no data are available to exclude such operations in the earlier period.

April 22, 1938

only three-fifths of the total, for nearly two-fifths of the operations are done outside of hospitals, according to figures to be presented later. The Army and Navy medical departments are about the only organizations with populations under observation to which they give practically all medical care; thus operation rates can be computed for these groups, but they are selected classes with respect to age, sex, state of health, and availability of surgical service. The rates, therefore, give little indication of the number of operations that occur in the general population.

I. SOURCE AND CHARACTER OF DATA

In the study of illness in canvassed white families in 130 localities in 18 States⁴ that was made by the Committee on the Costs of Medical Care (12) and the United States Public Health Service, all service received from physicians and other practitioners was recorded, including the nature of surgical procedures used. This record of all surgical operations for persons in the observed population affords data on the frequency of these procedures during the 12 months covered by periodic canvasses.

The composition and characteristics of the group of 8,758 families which were kept under observation for 12 consecutive months in the years 1928-31 have been considered in some detail in the first report in the series (1). These families, including a total of 39,185 individuals, resided in 18 States representing all geographic sections. Every size of community was included, from metropolitan districts to small industrial and agricultural towns and rural unincorporated areas.⁵ With respect to income, the distribution was reasonably similar to the estimated distribution of the general population of the United States at the time of the survey.

Definition of illness and of surgical procedure.—An illness, for the purpose of this study, was defined as any symptom, disorder, or affection which persisted for one or more days or for which medical service⁶ was received or medicine purchased. In general, the illness record covers the ailments which the family informant remembered and designated as illness.

Provision was made for recording all surgical procedures that were done during the study year in connection with any illness. Since nurses made the periodic canvasses, it may be assumed that a more

⁴ The 18 States sampled and the number of canvassed families were as follows: California (890), Colorado (386), Connecticut (100), District of Columbia (90), Georgia (544), Illinois (463), Indiana (494), Kansas (301), Massachusetts (287), Michigan (329), Minnesota (224), New York (1,710), Ohio (1,148), Tennessee (212), Virginia (412), Washington (551), West Virginia (318), Wisconsin (290). Further details about the distribution of the canvassed population are included in a preceding paper (1).

⁵ Every community that was included in the study had either a local health department or some other organization employing a visiting nurse or both; possibly the rural communities of this kind may have had more surgical operations than those with no such organizations.

⁶ Exclusive of dental service, eye refractions, immunizations and health examinations rendered when no symptoms were present.

complete record of operations was obtained than would have been secured by visitors with no knowledge of surgical procedures. The entry as made by the nurse was accepted without correction, except to consider as surgical any case in which the diagnosis itself indicated that surgical treatment had been given but not recorded as such on the schedule. Examples of these diagnoses are boil lanced, abscess drained, and fracture of the leg or other part of the body which would involve the setting of a bone or placing of a cast. The definition of a surgical procedure was necessarily inexact, but in general it was the common conception of any treatment which involves the cutting of tissue or suturing of wounds, plus the setting of a bone or placing of a cast. While these latter procedures are seldom included in the definition of an operation, they are surgical in nature. Accidental injuries and childbirth were not considered surgical unless some specific surgical procedure was reported on the case; the use of forceps was not considered a surgical procedure. Operations and surgical cases as used in this study refer always to cases which actually had surgical treatment and do not include those cases sometimes designated as surgical merely because of the nonmedical nature of the case.

II. FREQUENCY OF SURGICAL PROCEDURES IN THE WHOLE GROUP OBSERVED

The frequency of surgical operations in a given population group may be expressed in at least two ways:

1. The annual number of surgical operations per 1,000 persons under observation.

2. The percentage of all cases of illness that were treated surgically.

The first measure, which considers the frequency of surgical treatment without regard to the number of illnesses or the need for surgery, is the subject of this paper; the second will be treated in another article in this series.

For the total of 38,544 person-years of observation there were 2,623 surgical operations,⁷ an annual rate (adjusted for age) of 65.0 operations per 1,000 persons. This includes surgical treatment in connection with both primary and contributory causes of illness and in a few instances two or more operations in connection with the same

⁷ Hospitals sometimes divide all cases into "medical" and "surgical," including in the latter all accident cases, whether or not there was any actual operation in connection with the case. If this procedure were used in this study, it would greatly increase the number of surgical cases; there were 1,903 accidents (exclusive of poisonings) that were attended by a doctor but not classified as surgical, which would add 73 percent to the total of 2,623 operations as defined in this study.

Some doctors also consider all births, miscarriages, and abortions as surgical in nature. There were 852 such cases attended by a doctor but not classified as surgical, which would add 32 percent to the total of 2,623 operations as defined in this study.

These two changes in the definition of surgical treatment would more than double the number of operations; however, neither change seems justified. The doctor's service on many of the accident cases classified as non-surgical may have been only an examination to determine whether injury had occurred. Likewise the consensus of medical opinion probably would not consider all maternity cases as surgical in nature. When such cases are designated as surgical it is usually because they do not fit into the medical class.

diagnosis. The annual rate for sole or primary diagnoses that had surgical treatment in connection with them was 60 per 1,000 (age corrected). Of the total of 34,287 diagnoses (sole, primary, and contributory)* 7.6 percent were treated surgically.

Age and sex.—Table 1 and figure 1 show the age and sex incidence of all surgical operations. The adjusted rates are 62 and 68 per 1,000 for males and females, respectively. Since a considerable amount of surgery is done in connection with diseases and conditions not common to the two sexes, rates are shown also for all operations except those in connection with male and female genital and puerperal diagnoses. For all operations except those diagnoses the rates are nearly the same for the two sexes, 58 and 56 per 1,000 for males and females, respectively.

The age incidence of surgical operations shows two distinct peaks, one at 5-9 and one at 30-34 years. The earlier peak is largely accounted for by tonsillectomy and the latter by female genital and

TABLE 1.—*Frequency of all surgical operations among males and females of specific ages—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31*

| Age | Annual operation rate per 1,000 population | | | | | | Number of operations | | | | | | Population (years of life) ² | | | |
|-----------------------------|--|-------|--------|---|-------|--------|----------------------|--------|-------|---|------------|--------|---|------------|-------|--------|
| | All operations | | | All except male and female genital ¹ and puerperal | | | All operations | | | All except male and female genital ¹ and puerperal | | | | | | |
| | Both sexes | Male | Female | Both sexes | Male | Female | Male | Female | Male | Female | Both sexes | Male | Female | Both sexes | Male | Female |
| All ages: ³ | | | | | | | | | | | | | | | | |
| Adjusted ⁴ | 65.0 | 61.8 | 67.6 | 56.9 | 57.6 | 56.2 | 1,263 | 1,360 | 1,159 | 1,141 | 38,544 | 18,896 | 19,627 | | | |
| Crude..... | 68.1 | 66.8 | 69.3 | 59.7 | 61.3 | 58.1 | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| Under 5..... | 72.2 | 88.3 | 55.9 | 57.9 | 60.9 | 55.1 | 248 | 150 | 171 | 148 | 5,513 | 2,808 | 2,684 | | | |
| 5-9..... | 93.1 | 105.7 | 80.8 | 91.2 | 101.8 | 80.8 | 298 | 234 | 287 | 234 | 5,715 | 2,820 | 2,805 | | | |
| 10-14..... | 65.0 | 70.0 | 60.0 | 64.1 | 68.2 | 60.0 | 161 | 136 | 157 | 136 | 4,568 | 2,301 | 2,267 | | | |
| 15-19..... | 52.1 | 51.7 | 52.5 | 51.1 | 51.1 | 51.2 | 79 | 80 | 78 | 78 | 3,050 | 1,527 | 1,523 | | | |
| 20-24..... | 66.1 | 55.9 | 73.5 | 55.2 | 55.9 | 54.7 | 50 | 60 | 50 | 67 | 2,119 | 894 | 1,225 | | | |
| 25-29..... | 71.9 | 66.8 | 82.0 | 63.4 | 55.8 | 51.8 | 57 | 122 | 56 | 77 | 2,491 | 1,004 | 1,487 | | | |
| 30-34..... | 78.1 | 68.7 | 93.7 | 60.3 | 58.7 | 61.7 | 82 | 164 | 82 | 108 | 3,149 | 1,398 | 1,751 | | | |
| 35-44..... | 63.1 | 50.3 | 75.9 | 50.9 | 50.3 | 51.5 | 150 | 224 | 150 | 152 | 5,930 | 2,979 | 2,951 | | | |
| 45-54..... | 46.3 | 40.1 | 53.8 | 42.1 | 39.0 | 45.8 | 74 | 81 | 72 | 69 | 3,351 | 1,845 | 1,506 | | | |
| 55-64..... | 48.2 | 48.5 | 47.8 | 48.5 | 47.3 | 43.3 | 39 | 32 | 38 | 29 | 1,473 | 804 | 669 | | | |
| 65 and over..... | 61.1 | 52.6 | 67.7 | 52.1 | 36.6 | 64.2 | 23 | 38 | 16 | 36 | 908 | 437 | 561 | | | |

¹ "Female genital" includes female breast in this table and all other tables.

² 1 "year of life" is the equivalent of 12 months of observation for 1 person; for example, 2 persons observed for 6 months each are counted as 1 year of life. "Years of life" in these columns are the base populations used for computing annual rates in this study.

³ "All ages" includes a few of unknown age; "both sexes" includes a few of unknown sex.

⁴ Rates for all ages are adjusted by the *direct* method to the age distribution of the white population of the registration States in 1930, as a standard population; this population is given for specific ages in table 1 of a preceding paper (4). The adjustment method involves the weighting of the age specific rates for the canvassed population according to the age distribution of the standard population. The details of the process are given under the heading of "corrected death-rates" in Pearl (*18*, pp. 269-271).

* Throughout this paper the frequency of surgical treatment is measured by the total number of operations regardless of whether the diagnosis on which they were done was sole, primary, or contributory. The tables of duration and other items that measure severity, however, are based on sole diagnoses only.

puerperal diagnoses; the adult peak in the curve for males is very small. When female genital and puerperal operations are eliminated from the comparison, the frequency of operations is almost identical for corresponding adult ages of the two sexes.

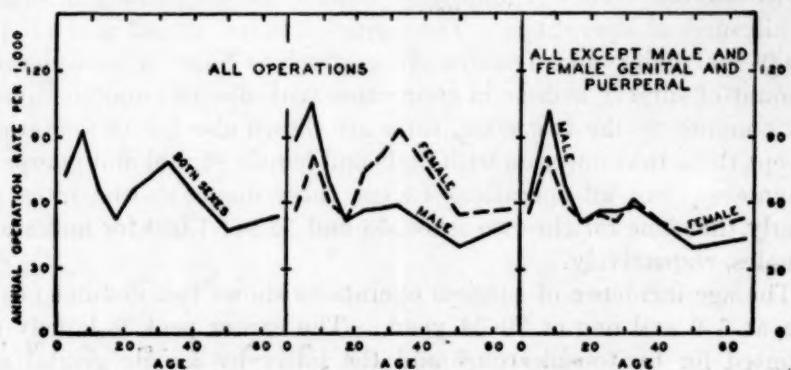


FIGURE 1.—Frequency of all surgical operations among males and females of specific ages—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31.

Surgical procedures include everything from a major abdominal operation to lancing a boil or removing a wart. It is necessary to

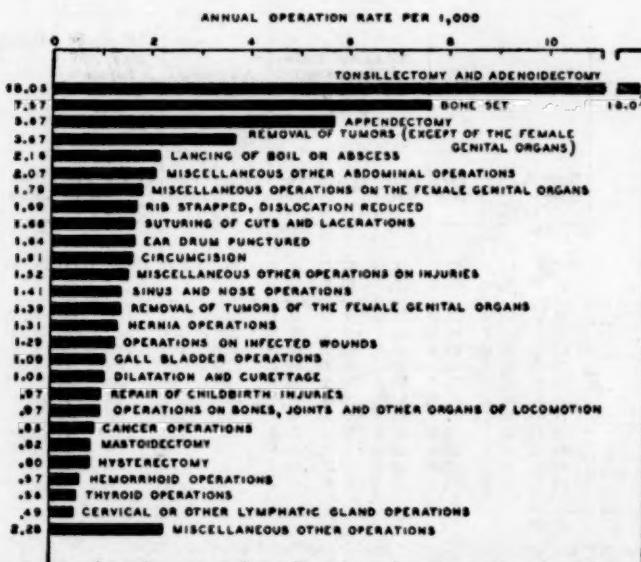


FIGURE 2.—Frequency of certain surgical operations among 8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31. (Rates adjusted to the age distribution of the white population of the registration States in 1930.)

consider the various kinds of operations before the age curves in figure 1 have much meaning. Rates (adjusted for age) for different kinds of operations are shown in table 2 and figure 2. Tonsillectomy is by far the most frequent operation, constituting nearly one-third of

the total number reported. The next three most frequent operations are the setting of a bone, removal of the appendix, and the removal of benign tumors.

TABLE 2.—*Frequency of certain surgical operations at specific ages—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

| Nature of operation | All ages ¹ | | | Age | | | | | | | | |
|--|-----------------------|-----------------------|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------------|
| | Number of operations | Adjusted ² | Crude | Under 5 | 5-9 | 10-14 | 15-19 | 20-24 | 25-34 | 35-44 | 45-54 | 55 and over |
| Annual operation rate per 1,000 persons of both sexes | | | | | | | | | | | | |
| All operations..... | 2,623 | 64.97 | 68.06 | 72.19 | 93.09 | 65.02 | 52.13 | 66.07 | 75.35 | 63.07 | 46.25 | 53.42 |
| Tonsillectomy and adenoidectomy..... | 845 | 18.05 | 21.92 | 27.03 | 55.12 | 31.09 | 15.41 | 14.16 | 13.12 | 9.95 | 5.97 | 2.43 |
| Sinus and nose operations..... | 50 | 1.41 | 1.30 | .18 | .70 | .44 | .98 | .47 | 2.84 | 2.19 | 1.79 | 1.62 |
| Eardrum punctured..... | 84 | 1.64 | 2.18 | 6.35 | 4.72 | 1.75 | 1.31 | 1.42 | .53 | .67 | | |
| Mastoidectomy..... | 39 | .82 | 1.01 | 2.36 | 2.45 | .44 | .98 | .47 | .35 | .34 | .30 | .40 |
| Cervical or other lymphatic gland operations..... | 26 | .49 | .67 | 2.54 | .70 | .88 | .33 | | .35 | .17 | | |
| Thyroid operations..... | 19 | .56 | .49 | | | | .33 | .47 | 1.42 | .84 | .90 | .40 |
| Appendectomy..... | 202 | 5.67 | 5.24 | .54 | 2.45 | 6.79 | 9.84 | 11.80 | 9.57 | 5.40 | .90 | 3.64 |
| Hernia operations..... | 43 | 1.31 | 1.12 | .54 | .70 | .44 | .98 | 1.42 | 1.60 | .67 | 2.69 | 2.43 |
| Gall bladder operations..... | 31 | 1.00 | .80 | | | | | 1.42 | .89 | 1.18 | 2.39 | 3.24 |
| Miscellaneous other abdominal operations..... | 69 | 2.97 | 1.71 | .56 | .17 | .22 | .33 | .26 | .26 | 3.71 | 2.00 | 4.96 |
| Hemorrhoid operations..... | 20 | .57 | .52 | | | | | .47 | .71 | 1.52 | 1.49 | .40 |
| Operations on bones, joints, and other organs of locomotion..... | 40 | .97 | 1.04 | 1.27 | .70 | 1.75 | 1.31 | 1.42 | .80 | 1.18 | .60 | |
| Lancing of boil or abscess..... | 83 | 2.16 | 2.15 | 2.54 | 1.22 | 1.31 | 3.93 | .94 | 3.58 | 2.19 | 1.19 | 1.62 |
| Cancer operations..... | 21 | .85 | .54 | | | | | | .18 | 1.01 | .90 | 4.45 |
| Removal of tumors (except of the female genital organs)..... | 125 | 3.67 | 3.24 | 1.27 | 1.75 | 1.00 | 2.95 | 2.36 | 3.55 | 5.40 | 7.16 | 8.26 |
| Removal of tumors of the female genital organs..... | 48 | 1.39 | 1.25 | | | | | | 2.83 | 3.55 | 2.70 | .90 |
| Hysterectomy..... | 31 | .80 | .80 | | | | | | 1.77 | 2.70 | .90 | .40 |
| Dilatation and curettage..... | 38 | 1.05 | .99 | | | | | .33 | 3.30 | 2.66 | 2.53 | |
| Repair of childbirth injuries..... | 36 | .97 | .93 | | | | | | 1.42 | 4.08 | 1.01 | .60 |
| Miscellaneous other operations on the female genital organs..... | 66 | 1.79 | 1.71 | .36 | | | | .33 | 3.30 | 5.85 | 3.20 | 1.19 |
| Circumcision..... | 94 | 1.61 | 2.44 | 13.97 | 1.92 | .88 | | | | .18 | | .30 |
| Bone set..... | 206 | 7.57 | 7.68 | 6.53 | 12.07 | 11.38 | 6.56 | 5.66 | 4.61 | 6.41 | 4.77 | 10.93 |
| Rib strapped, dislocation reduced..... | 50 | 1.69 | 1.30 | | .35 | .66 | 1.64 | 2.36 | 1.42 | 1.35 | 2.39 | 4.45 |
| Suturing of cuts and lacerations..... | 70 | 1.68 | 1.82 | 2.18 | 3.67 | .66 | .98 | 3.30 | 1.60 | 1.35 | 1.49 | .81 |
| Operations on infected wounds..... | 49 | 1.29 | 1.27 | .36 | .70 | 1.75 | 1.31 | .47 | 2.48 | 1.35 | 2.09 | .40 |
| Miscellaneous other operations on injuries..... | 67 | 1.52 | 1.74 | 2.18 | 1.40 | 2.41 | .98 | .94 | 2.48 | 2.02 | .60 | .40 |
| Miscellaneous other operations..... | 84 | 2.28 | 2.19 | 1.45 | 2.30 | 1.06 | 1.32 | 2.84 | 2.82 | 2.03 | 2.65 | 3.66 |
| Annual operation rate per 1,000 females | | | | | | | | | | | | |
| Removal of tumors of the female genital organs..... | 48 | 2.64 | 2.45 | | | | | | 4.90 | 6.18 | 5.42 | 1.99 |
| Hysterectomy..... | 31 | 1.56 | 1.58 | | | | | | | 3.09 | 5.42 | 1.99 |
| Dilatation and curettage..... | 38 | 1.95 | 1.94 | | | | | .66 | 5.71 | 4.63 | 5.06 | |
| Repair of childbirth injuries..... | 36 | 1.82 | 1.83 | | | | | | 2.45 | 7.10 | 2.03 | 1.33 |
| Miscellaneous other operations on the female genital organs..... | 66 | 3.35 | 3.36 | 0.75 | | | | | .66 | 5.71 | 10.19 | 6.44 |
| | | | | | | | | | | | 2.60 | |

¹ "All ages" includes a few of unknown age; "both sexes" includes a few of unknown sex.

² Adjusted by the *direct* method as described in note to table 1.

TABLE 2.—*Frequency of certain surgical operations at specific ages—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31—Continued*

| Nature of operation | All ages | | | Age | | | | | | | | | |
|---------------------------------------|----------------------|----------|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------------|--|
| | Number of operations | Adjusted | Crude | Under 5 | 5-9 | 10-14 | 15-19 | 20-24 | 25-34 | 35-44 | 45-54 | 55 and over | |
| Annual operation rate per 1,000 males | | | | | | | | | | | | | |
| Circumcision..... | 94 | 3.17 | 4.97 | 27.42 | 3.90 | 1.74 | ..... | ..... | 0.42 | ..... | 0.54 | ..... |  |
| Population (years of life) | | | | | | | | | | | | | |
| Both sexes..... | 38,544 | ..... | ..... | 5,513 | 5,715 | 4,568 | 3,050 | 2,119 | 5,640 | 5,930 | 3,351 | 2,471 | |
| Female..... | 19,627 | ..... | ..... | 2,684 | 2,895 | 2,267 | 1,523 | 1,225 | 3,238 | 2,951 | 1,506 | 1,230 | |
| Male..... | 18,896 | ..... | ..... | 2,808 | 2,820 | 2,301 | 1,527 | 894 | 2,402 | 2,979 | 1,845 | 1,241 | |

If operations in connection with injuries are considered as a unit, they amount to 20.3 percent of the total, and the group of female genital and puerperal operations equals 8.3 percent of the total. When these two groups are added to tonsillectomy (32.2 percent) and appendectomy (7.7 percent), the four fairly specific types of operations make up about two-thirds of all operations.

Figure 2 presents a total of 26 fairly specific kinds of operations which include all that occurred with sufficient frequency in this study to be of statistical value.

Figures 3 and 4 show the age incidence of 24 of the 26 groups of operations. The vertical, or rate, scales for these charts are made in such a way that the relative age curves are comparable from one operation to another, whether the actual rate is small or large. In considering age incidence, however, one must discount minor fluctuations in the curves and think only of their general outlines. This is necessary because of the attempt to show here the incidence of every possible operation with sufficient numbers to give a general picture of the age curve.

The age incidence of the operations shown graphically in figures 3 and 4 need not be described in detail, but a few points may be mentioned briefly. Tonsillectomy pertains chiefly to the late preschool and early school ages, the peak being at 6 years (table 3). Other operations that are relatively frequent in the school ages are the setting of bones in fracture cases; the suturing of cuts; and operations for diseases of the bones, joints, and organs of locomotion. Puncturing the ear drum, mastoidectomy, and operations on the cervical and other lymphatic glands are high in the preschool ages, with markedly declining rates as age increases. Appendectomy, sinus operations, surgical treatment of infected wounds, and lancing of boils have their peaks in the young

adult ages, 20 to 35 years. The operations with somewhat later peaks and distinct declines in the older ages are those for hemorrhoids and for thyroid and the various operations in connection with female genital and puerperal diagnoses. The operations that are more frequent in the older ages are those for gall bladder, hernia, cancer, tumor, dislocations, and fractures.

In many instances surgical cases represent a rather small proportion of the total cases, but the age curves are generally similar to those for all cases of corresponding diagnoses. This matter will be considered in more detail in a later paper.

TABLE 3.—*Frequency of certain surgical operations among children classified by single years of age—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

| Age | Annual operation rate per 1,000 population | | | Number of operations | | | Population (years of life) | |
|-----------------------|--|----------------------------|-------------------------------|---------------------------------|----------------------------|-----------------------|----------------------------|-------|
| | Tonsillectomy and adenoidectomy | Ear and mastoid operations | Circumcisions per 1,000 males | Tonsillectomy and adenoidectomy | Ear and mastoid operations | Circumcisions (males) | Both sexes | Males |
| All under 15: | | | | | | | | |
| Adjusted ¹ | 38.2 | 6.0 | 10.6 | 606 | 99 | 92 | 15,796 | 7,929 |
| Crude | 38.4 | 6.3 | 11.6 | | | | | |
| Under 1: | 2.0 | 8.1 | 116.4 | 2 | 8 | 2 | 990 | 481 |
| 1 | 12.7 | 10.3 | 12.3 | 16 | 13 | 8 | 1,261 | 652 |
| 2 | 23.0 | 9.6 | 6.4 | 24 | 10 | 3 | 1,044 | 558 |
| 3 | 41.0 | 6.5 | | 44 | 7 | 4 | 1,072 | 535 |
| 4 | 55.0 | 8.7 | | 63 | 10 | 6 | 1,146 | 582 |
| 5 | 56.3 | 13.7 | 7.0 | 66 | 16 | 2 | 1,172 | 598 |
| 6 | 68.2 | 8.6 | | 70 | 10 | 5 | 1,158 | 569 |
| 7 | 63.2 | 2.6 | 5.9 | 74 | 3 | 2 | 1,171 | 615 |
| 8 | 52.2 | 5.0 | | 63 | 6 | 1 | 1,207 | 565 |
| 9 | 32.8 | 6.0 | 1.9 | 33 | 6 | 1 | 1,007 | 513 |
| 10 | 45.5 | | | 49 | 4 | | 1,077 | 542 |
| 11 | 31.0 | | | 28 | 3 | | 903 | 461 |
| 12 | 33.9 | 2.2 | 1.7 | 31 | | 2 | 915 | 467 |
| 13 | 22.9 | | | 19 | 3 | 1 | 829 | 401 |
| 14 | 17.8 | | | 15 | | 1 | 844 | 430 |

¹ Rates for all ages under 15 are adjusted for differences in age distribution within the 15-year span (using the three 5-year age groups only) by the *direct* method as described in note to table 1.

² Of the 56 circumcisions under 1 year of age, 40 were under 1 month of age, a monthly rate of 110 per 1,000 male live births which, on an annual basis, is equal to 1,322 per 1,000 male live births.

Table 3 shows rates by single years of age for three operations that occur largely in childhood. The tonsillectomy rate under 1 year is low; after that age the rates rise continuously to a maximum of 68 per 1,000 at 6 years and 63 at 7 years. After this peak the frequency decreases rapidly as age increases; the rate at 14 years is about the same as among 1- and 2-year-old children.

Ear and mastoid operations show a maximum of 14 per 1,000 at 5 years, but the rates at all of the ages under 5 are relatively high, ranging from 7 to 10 as compared with 2 per 1,000 at 10 to 14 years.

A large part of the circumcisions were done under 1 year of age, the rate for that group being 116 per 1,000 males, as compared with a rate

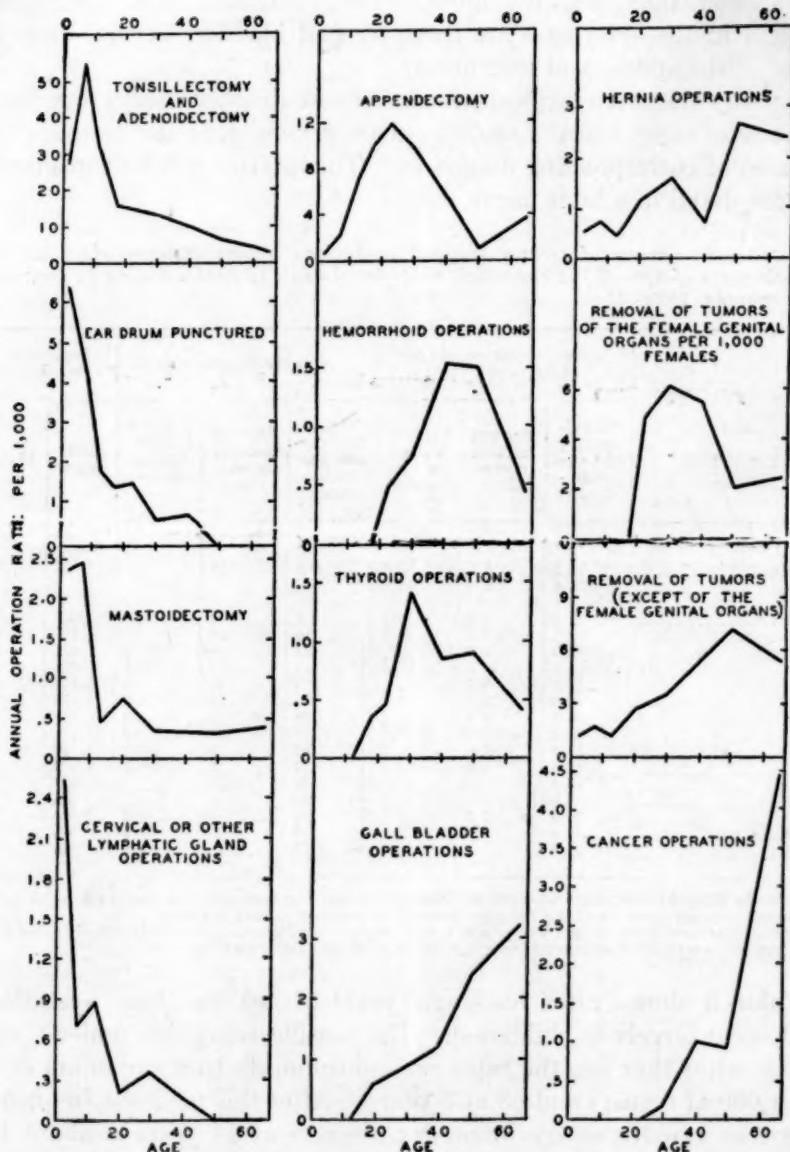


FIGURE 3.—Frequency of certain surgical operations at specific ages—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31. (Scales are so made that the adjusted rate for all ages represents an interval on the vertical rate scale that corresponds to 20 years on the horizontal age scale. In some instances the ages 15 to 24 are plotted as one group but shown in the tables as two groups.)

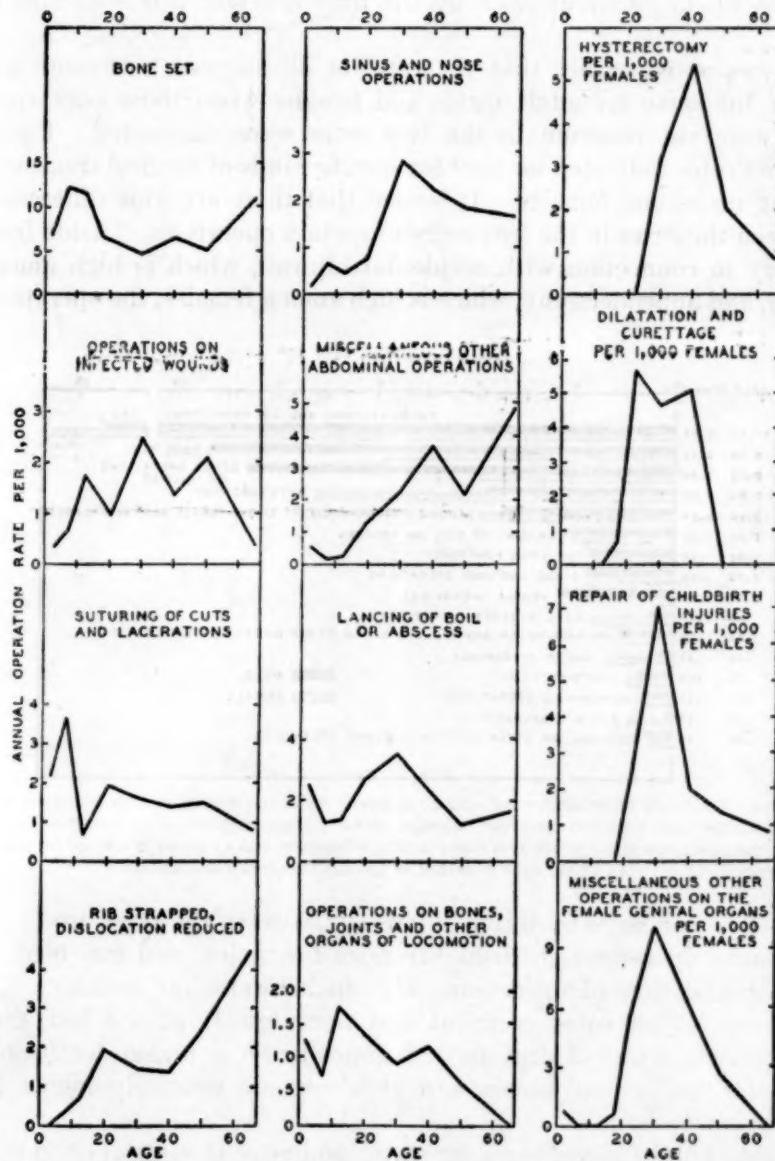


FIGURE 4.—Frequency of certain surgical operations at specific ages (continued).

of 12 for those who were 1 year of age, and rates under 10 per 1,000 for every other age group. Circumcisions under 1 month of age amount to 110 per 1,000 male live births; if circumcision continued at this frequency in the succeeding months of life, practically all male infants would be circumcised by the time they reached 9 months of age.

It was noted earlier that the rate for all surgical treatment was about the same for adult males and females when those operations that were not common to the two sexes were eliminated. Figure 5 shows rates (adjusted for age) for specific kinds of surgical treatment among males and females. It is seen that there are wide differences between the sexes in the frequency of certain operations. Aside from surgery in connection with accidental injuries, which is high among males, and appendectomy, which is high among females, the operations

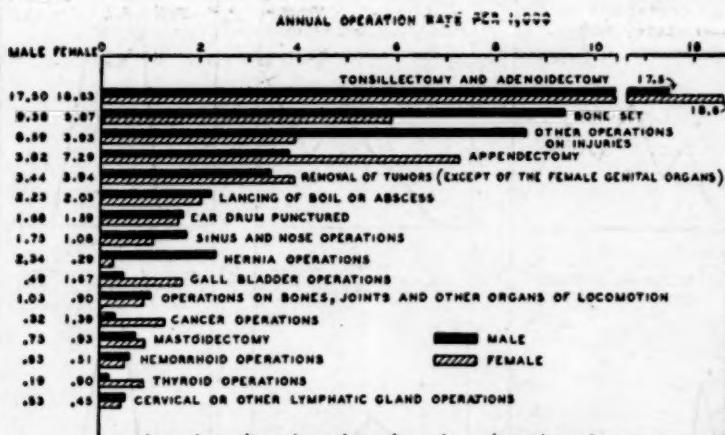


FIGURE 5.—Frequency of certain surgical operations among males and females in 8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31. (Rates adjusted to the age distribution of the white population of the registration States in 1930; adjustment was by the *direct* method for the first 6 operations (table 4), but by the *indirect* method for the other less frequent operations.)

that show the largest relative differences between the sexes are hernia and sinus operations, with higher rates for males; and gall bladder, cancer, and thyroid operations, with higher rates for females. The incidence of all cases (surgical and nonsurgical) of the last three diagnoses and also of sinusitis and appendicitis is higher for females than for males, but hernia and accidents are definitely higher for males.

Table 4 and figure 6 show for the more frequent surgical operations the age incidence for males and females separately. It is here seen that the similarity in age incidence in the two sexes for all operations common to both groups is also misleading; an extremely high rate of appendectomy among females of the young adult ages is balanced by high rates for operations in connection with injuries among males of

TABLE 4.—*Frequency of certain surgical operations among males and females of specific ages—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

| Nature of operation | All ages ¹ | | | Age | | | | | | | | |
|--|-----------------------|------------------------|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------------|
| | Number of operations | Ad-justed ² | Crude | Under 5 | 5-9 | 10-14 | 15-19 | 20-24 | 25-34 | 35-44 | 45-54 | 55 and over |
| Annual operation rate per 1,000 males and females | | | | | | | | | | | | |
| Tonsillectomy and adenoidectomy: | | | | | | | | | | | | |
| Male..... | 404 | 17.50 | 21.38 | 23.9 | 58.2 | 27.8 | 14.4 | 13.4 | 12.9 | 11.1 | 4.9 | 1.6 |
| Female..... | 441 | 18.63 | 22.47 | 30.6 | 52.2 | 34.4 | 16.4 | 14.7 | 13.3 | 8.8 | 7.3 | 3.2 |
| Ear and mastoid operations: | | | | | | | | | | | | |
| Male..... | 63 | 2.41 | 3.33 | 10.7 | 6.4 | 3.5 | 1.3 | 2.2 | .4 | .7 | | |
| Female..... | 60 | 2.52 | 3.06 | 6.7 | 7.9 | .9 | 3.3 | 1.6 | 1.2 | 1.4 | .7 | .8 |
| Appendectomy: | | | | | | | | | | | | |
| Male..... | 66 | 3.82 | 3.49 | .7 | 1.8 | 5.2 | 5.9 | 6.7 | 7.1 | 3.7 | .5 | 2.4 |
| Female..... | 136 | 7.29 | 6.95 | .4 | 3.1 | 8.4 | 13.8 | 15.5 | 11.4 | 7.1 | 1.3 | 4.9 |
| Miscellaneous other abdominal operations: | | | | | | | | | | | | |
| Male..... | 71 | 4.81 | 3.76 | 1.1 | 1.8 | 1.3 | 2.0 | 3.4 | 5.4 | 3.0 | 7.6 | 14.5 |
| Female..... | 69 | 4.12 | 3.52 | 1.1 | | | | 7 | 7.4 | 4.3 | 8.1 | 6.6 |
| Lancing of boil or abscess: | | | | | | | | | | | | |
| Male..... | 39 | 2.23 | 2.06 | 2.1 | 1.1 | 1.3 | 3.3 | 1.1 | 2.5 | 2.7 | 1.6 | 3.2 |
| Female..... | 44 | 2.03 | 2.24 | 3.0 | 1.4 | 1.3 | 4.6 | .8 | 4.3 | 1.7 | | |
| Removal of tumors (except of the female genital organs): | | | | | | | | | | | | |
| Male..... | 58 | 3.44 | 3.07 | 1.1 | 2.1 | .9 | 3.3 | 2.2 | 3.8 | 5.4 | 4.3 | 5.6 |
| Female..... | 67 | 3.94 | 3.41 | 1.5 | 1.4 | 1.3 | 2.6 | 2.4 | 3.4 | 5.4 | 10.6 | 4.9 |
| Operations on the female genital organs: Female..... | 219 | 11.32 | 11.16 | .8 | | | 1.3 | 18.8 | 31.2 | 24.4 | 8.0 | 4.1 |
| Circumcision: Male..... | 94 | 3.17 | 4.97 | 27.4 | 3.9 | 1.7 | | | .4 | | .5 | |
| Bone set: | | | | | | | | | | | | |
| Male..... | 192 | 9.38 | 10.16 | 8.9 | 17.4 | 16.1 | 11.1 | 10.1 | 5.8 | 8.1 | 5.4 | 5.6 |
| Female..... | 104 | 5.87 | 5.30 | 4.1 | 6.9 | 6.6 | 2.0 | 2.4 | 3.7 | 4.7 | 4.0 | 16.3 |
| Operations on injuries (except setting of bone): | | | | | | | | | | | | |
| Male..... | 157 | 8.59 | 8.31 | 5.7 | 8.2 | 6.5 | 6.6 | 12.3 | 11.2 | 8.7 | 9.8 | 8.1 |
| Female..... | 79 | 3.93 | 4.03 | 3.7 | 4.2 | 4.4 | 3.3 | 3.3 | 5.6 | 3.4 | 2.7 | 4.1 |
| Miscellaneous other operations: | | | | | | | | | | | | |
| Male..... | 119 | 6.45 | 6.31 | 6.8 | 5.0 | 5.6 | 4.0 | 4.5 | 8.3 | 7.0 | 5.4 | 8.9 |
| Female..... | 141 | 7.92 | 7.17 | 4.1 | 3.8 | 2.6 | 4.6 | 6.5 | 9.9 | 10.8 | 12.0 | 12.2 |
| Population (years of life) | | | | | | | | | | | | |
| Male..... | 18,896 | | | 2,808 | 2,820 | 2,301 | 1,527 | 894 | 2,402 | 2,979 | 1,845 | 1,241 |
| Female..... | 19,627 | | | 2,684 | 2,805 | 2,267 | 1,523 | 1,225 | 3,238 | 2,951 | 1,506 | 1,230 |

¹ "All ages" includes a few of unknown age.

² Adjusted by the *direct* method as described in note to table 1.

those ages. The high rate for males for operations in connection with injuries might be expected, in view of the greater incidence of industrial accidents among men and the greater frequency of accidents of all kinds among boys than girls (11). The excess of appendectomies among women is greatest at 20–24 years, but the relative difference is large at all ages above 5 years. One immediately thinks of the common practice of removing the appendix in connection with other abdominal operations, such as those on the female genital organs. Of the 136 appendectomies on females, in 37 there was some other operation performed at the same time, and 26 of these were in connection with female genital diseases; as 17 of these female genital opera-

tions would probably involve an abdominal incision, the appendix may have been removed without clinical appendicitis. Even if it be assumed that the entire 26 cases were appendectomies without clinical appendicitis and are excluded, the reported appendectomy rate for females would still be 60 percent above that for males. If the removal of the appendix in connection with other operations is important in

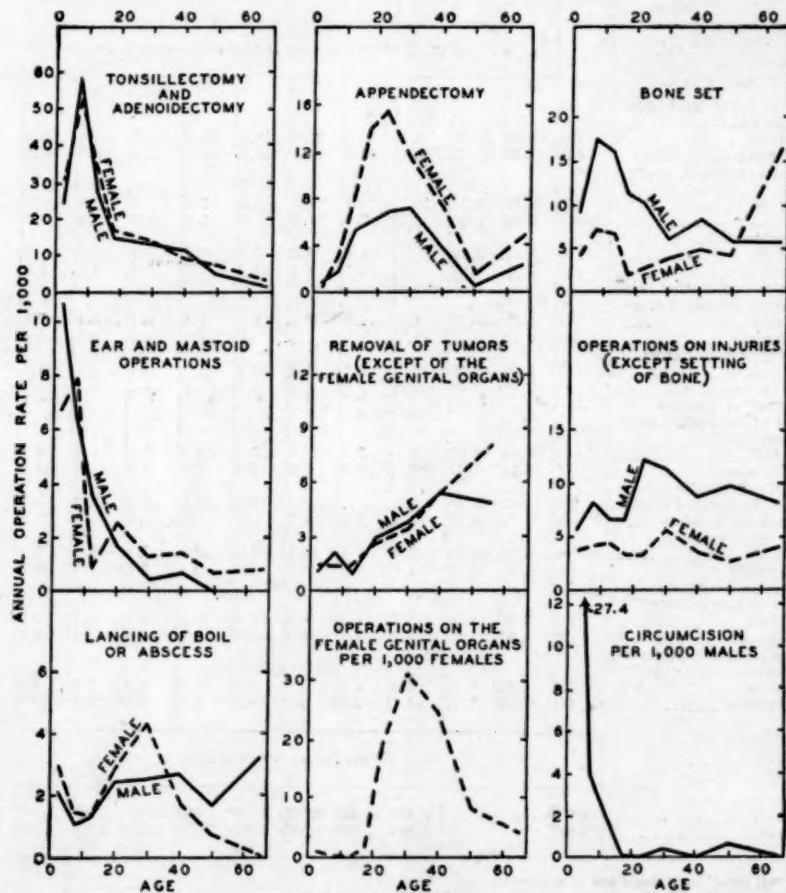


FIGURE 6.—Frequency of certain surgical operations among males and females of specific ages—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31. (Scales are so made that the adjusted rate for all ages of both sexes represents an interval on the vertical rate scale that corresponds to 20 years on the horizontal age scale. In some instances the ages 15 to 24 are plotted as one group but shown in the tables as two groups.)

the excess in the recorded appendectomy rate for females, a considerable number of such removals must have been reported with no mention of the primary disease or operation.

Marital status.—Table 5 shows the incidence of surgical treatment among single and married persons. Among females the rate for all operations is definitely higher for married women below 30 years of age, but there is no difference at 30-34 years. When surgery in connection

with female genital and puerperal diagnoses is eliminated, the differences between the rates for single and married women are not statistically significant⁹ for any age group and are not consistent in the several groups. The rate for single males at 20-24 years is just enough above that for married males to be statistically significant; probably more of the single males are economically able to pay for surgery, or if in college they may get it as a part of provided medical care.

TABLE 5.—*Frequency of all surgical operations among single and married males and females of specific ages—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31*

| Age and marital status | Annual operation rate per 1,000 population | | | | | | Number of operations | | | | Population (years of life) | | |
|------------------------|--|------|--------|---|------|--------|----------------------|--------|---|--------|----------------------------|-------|--------|
| | All operations | | | All operations except male and female genital and puerperal | | | All operations | | All operations except male and female genital and puerperal | | | | |
| | Both sexes | Male | Female | Both sexes | Male | Female | Male | Female | Male | Female | Both sexes | Male | Female |
| Total 20-34: | | | | | | | | | | | | | |
| Single..... | 62.4 | 61.2 | 62.0 | 59.1 | 60.7 | 57.3 | 57 | 56 | 56 | 51 | 1,812 | 922 | 890 |
| Married..... | 75.8 | 55.8 | 89.5 | 55.7 | 55.8 | 55.6 | 132 | 313 | 132 | 195 | 5,500 | 2,364 | 3,503 |
| 20-24: | | | | | | | | | | | | | |
| Single..... | 65.0 | 63.7 | 66.5 | 64.2 | 63.7 | 64.8 | 42 | 38 | 42 | 37 | 1,230 | 650 | 571 |
| Married..... | 67.5 | 34.3 | 79.6 | 42.3 | 34.3 | 45.2 | 8 | 51 | 8 | 29 | 874 | 233 | 641 |
| 25-29: | | | | | | | | | | | | | |
| Single..... | 44.0 | 57.8 | 31.4 | 41.2 | 52.0 | 31.4 | 10 | 6 | 9 | 6 | 364 | 173 | 191 |
| Married..... | 76.6 | 50.8 | 89.4 | 55.6 | 56.8 | 54.9 | 47 | 114 | 47 | 70 | 2,103 | 828 | 1,275 |
| 30-34: | | | | | | | | | | | | | |
| Single..... | 78.0 | 55.6 | 93.8 | 59.6 | 55.6 | 62.5 | 5 | 12 | 5 | 8 | 218 | 90 | 123 |
| Married..... | 77.8 | 59.1 | 98.1 | 59.8 | 59.1 | 60.4 | 77 | 148 | 77 | 98 | 2,892 | 1,303 | 1,589 |

Table 6 shows rates for 5 types of operations among single and married persons 20-34 years of age. The only statistically significant difference between single and married persons of the same sex is the large excess in operations in connection with female genital and puerperal diagnoses for married women. With the small numbers involved, the other differences are not greater than might be expected by chance.

TABLE 6.—*Frequency of certain surgical operations among single and married males and females of the ages 20-34 years—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31*

| Nature of operation | Annual operation rate per 1,000 population | | | | Number of operations | | | |
|--|--|---------|--------|---------|----------------------|---------|--------|---------|
| | Male | | Female | | Male | | Female | |
| | Single | Married | Single | Married | Single | Married | Single | Married |
| Tonsillectomy and adenoidectomy..... | 14.1 | 12.7 | 18.0 | 12.6 | 13 | 30 | 16 | 44 |
| Appendectomy..... | 6.5 | 7.2 | 13.5 | 12.3 | 6 | 17 | 12 | 43 |
| Operations on the female genital organs..... | | | 5.6 | 33.7 | | | 5 | 118 |
| Operations on injuries..... | 24.9 | 16.1 | 6.7 | 8.3 | 23 | 38 | 6 | 29 |
| Miscellaneous other operations..... | 16.3 | 19.9 | 19.1 | 22.5 | 15 | 47 | 17 | 79 |
| Population (years of life)..... | | | | | 922 | 2,364 | 890 | 3,503 |

* More than one operation for the same individual during the year occurred so rarely that the probable error has been used throughout this study as though no person had more than one operation.

III. VARIATION IN THE FREQUENCY OF SURGICAL PROCEDURES WITH ECONOMIC STATUS

The proportion of operations done in an emergency that demands immediate action to save life is not large; probably the majority are planned leisurely and done at a previously scheduled time. Because of the large number of non-emergency operations, one would expect more surgery among the higher income groups of families where funds are available for medical care that is not immediately necessary.

Occupation.—Table 7 and figure 7 show operation rates (adjusted for age) per 1,000 males and females classified by broad occupational

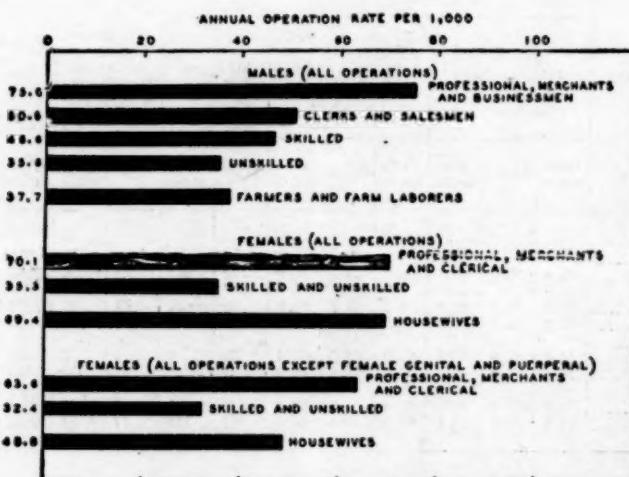


FIGURE 7.—Frequency of all surgical operations among males and females 15-64 years of age engaged in different classes of occupations—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31. (Rates adjusted to the age distribution of the white population 15-64 years of age in the registration States in 1930.)

groups. Rates for females are shown for all surgery and for all except operations in connection with female genital and puerperal diagnoses. For males, operations were about twice as frequent among professional and business men as among unskilled laborers; clerks and skilled laborers fall logically between these extremes, with a slightly higher frequency for the clerical group. For females, all classes of labor are combined; and here, likewise, operations are twice as frequent in the professional and clerical as in the laboring group. Housewives fall midway between the two employed classes when operations in connection with female genital and puerperal diagnoses are eliminated.

TABLE 7.—Frequency of all surgical operations in different occupational groups—
8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31

| Sex and occupational group | Number of operations, all ages 15-64 | Annual operation rate per 1,000 population | | | | Population | | |
|--|--------------------------------------|--|-------|-------|-------|----------------|-------|-------|
| | | All ages, 15-64 | | Age | | All ages 15-64 | Age | |
| | | Adjusted | Crude | 15-34 | 35-64 | | 15-34 | 35-64 |
| All operations | | | | | | | | |
| Males: | | | | | | | | |
| Professional, merchant, and businessmen..... | 143 | 74.9 | 72.3 | 72.4 | 72.3 | 1,978 | 525 | 1,453 |
| Clerks and salesmen..... | 75 | 50.9 | 51.2 | 52.2 | 50.4 | 1,464 | 690 | 774 |
| Skilled and semiskilled labor..... | 132 | 46.6 | 46.5 | 56.7 | 39.6 | 2,838 | 1,146 | 1,692 |
| Unskilled labor..... | 41 | 35.6 | 35.8 | 29.0 | 42.9 | 1,146 | 586 | 560 |
| Farmers and farm laborers..... | 35 | 37.7 | 36.5 | 57.9 | 26.3 | 958 | 311 | 647 |
| Females: | | | | | | | | |
| Professional, merchant, and clerical..... | 90 | 70.1 | 73.0 | 62.9 | 97.5 | 1,233 | 874 | 359 |
| Skilled and unskilled labor..... | 14 | 35.3 | 35.3 | 43.7 | 20.8 | 396 | 252 | 144 |
| Housewives..... | 589 | 69.3 | 74.6 | 86.5 | 65.3 | 7,897 | 3,444 | 4,453 |
| All operations except female genital and puerperal | | | | | | | | |
| Females: | | | | | | | | |
| Professional, merchant, and clerical..... | 81 | 63.6 | 65.7 | 56.1 | 80.1 | 1,233 | 874 | 359 |
| Skilled and unskilled labor..... | 13 | 32.4 | 32.8 | 39.7 | 20.8 | 396 | 252 | 144 |
| Housewives..... | 391 | 48.8 | 49.5 | 53.1 | 46.7 | 7,897 | 3,444 | 4,453 |

¹ Rates for the age group 15-64 years are adjusted for differences in age distribution within that span by the indirect method as described in note to table 8.

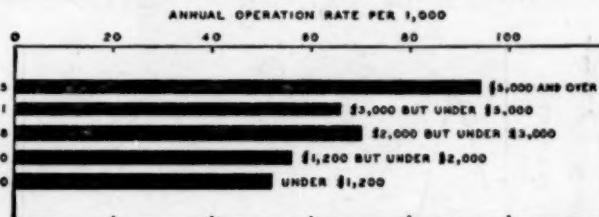


FIGURE 8.—Frequency of all surgical operations among persons classified according to total annual family income—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31. (Rates adjusted to the age distribution of the white population of the registration States in 1930.)

Income.—Data were obtained on the family's total income during the approximate year of the study. Since surgery usually involves considerable expense, one would expect more operations in the higher-income brackets. Table 8 and figure 8 show the frequency of surgery in each of five income groups, with adjustment of the rates for age differences among the various groups. The rates vary from 52 operations per 1,000 persons in families with annual incomes of less than \$1,200 to 94 in families with \$5,000 or more income. Between these extremes there is a gradual increase with income in the frequency of

surgical treatments, except for a slightly smaller rate in the \$3,000-\$5,000 class than in the next lower income group.

TABLE 8.—*Frequency at specific ages of all surgical operations among canvassed families of different income levels in 18 States during 12 consecutive months, 1928-31*

| Annual family income | All ages ¹ | | Age | | | | | | | | | |
|--------------------------------|-----------------------|-----------------------|-------|--|-------|-------|-------|-------|-------|-------|-------|-------------|
| | Number of operations | Adjusted ² | Crude | Under 5 | 5-9 | 10-14 | 15-19 | 20-24 | 25-34 | 35-44 | 45-54 | 55 and over |
| | | | | Annual operation rate per 1,000 population | | | | | | | | |
| Under \$1,200..... | 319 | 52.0 | 54.8 | 54.1 | 73.7 | 66.4 | 38.8 | 41.8 | 55.5 | 51.1 | 43.6 | 41.5 |
| \$1,200 but under \$2,000..... | 802 | 56.0 | 59.8 | 60.5 | 86.8 | 52.1 | 34.6 | 45.1 | 69.5 | 59.4 | 34.6 | 41.8 |
| \$2,000 but under \$3,000..... | 698 | 69.8 | 73.5 | 92.7 | 90.1 | 56.3 | 61.8 | 91.9 | 81.0 | 60.3 | 53.8 | 66.0 |
| \$3,000 but under \$5,000..... | 334 | 66.1 | 68.0 | 71.4 | 93.5 | 85.1 | 38.5 | 66.5 | 92.5 | 59.5 | 41.1 | 43.6 |
| \$5,000 and over..... | 439 | 94.5 | 93.6 | 114.9 | 161.3 | 97.2 | 94.5 | 88.7 | 80.2 | 90.5 | 59.5 | 71.0 |
| Population | | | | | | | | | | | | |
| Under \$1,200..... | 5,820 | — | — | 962 | 936 | 783 | 464 | 311 | 703 | 744 | 390 | 506 |
| \$1,200 but under \$2,000..... | 13,419 | — | — | 2,216 | 2,178 | 1,612 | 983 | 732 | 2,158 | 1,902 | 926 | 670 |
| \$2,000 but under \$3,000..... | 9,491 | — | — | 1,370 | 1,409 | 1,118 | 728 | 479 | 1,482 | 1,576 | 799 | 500 |
| \$3,000 but under \$5,000..... | 4,911 | — | — | 532 | 642 | 517 | 441 | 301 | 735 | 857 | 511 | 344 |
| \$5,000 and over..... | 4,689 | — | — | 383 | 502 | 504 | 434 | 327 | 536 | 807 | 689 | 465 |

¹ "All ages" includes a few of unknown age.

² Rates for all ages are adjusted by the *indirect* method to the age distribution of the white population of the registration States in 1930. Briefly, this method involves the following steps: Age specific rates from tables 1, 2, or 4, for the whole canvassed population are used as "standard rates" and multiplied by the canvassed population of specific ages for a given subgroup (for example, income under \$1,200) to obtain expected numbers of cases for the computation of an expected rate for all ages; when this rate is related to the adjusted rate for the corresponding surgical operation or group of operations in table 2 (adjustment there was by *direct* method), one obtains an "adjustment factor" which is of the nature of a percentage correction for differences in age distribution. This adjustment or correction factor is applied to the crude rate in the particular subgroup (for example, income under \$1,200) to obtain the adjusted rate. The details of the process are given under the heading "standardized death-rates" in Pearl (*18*, pp. 265-299).

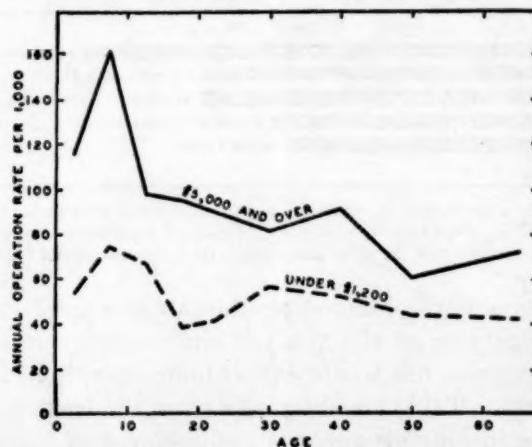


FIGURE 9.—Frequency of all surgical operations at specific ages among persons with high and with low total annual family income—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31.

As related to illness, surgery is also more frequent in the higher income groups; the percentage of diagnoses that were treated surgi-

cally increases from 6.6 percent for families with less than \$1,200 income per year to 8.8 percent in the class with \$5,000 or more.

Table 8 also shows rates for persons of specific ages and figure 9 shows them graphically for the lowest and highest income groups. The differences between these two extreme groups are large and consistent in the various ages. Reference to table 8, however, shows that for specific ages there is no regular increase with income in the operation rates for the intervening income groups. This lack of consistency in the relationship of the frequency of surgical treatment to income may be due partly to chance, for the numbers of cases in specific age and income classes are not large; the general tendency toward more operations in the higher income brackets is fairly clear.

Table 9 shows rates for each income group for 10 fairly specific types of operations, the rates being adjusted for age differences among the several income classes. These rates are plotted in the lower half

TABLE 9.—*Frequency of certain surgical operations among canvassed white families of different income levels in 18 States during 12 consecutive months, 1928-31*

| Nature of operation | Annual operation rate per 1,000 population (age adjusted) ¹ | | | | | Number of operations | | | | |
|--|--|---------------------------|---------------------------|---------------------------|------------------|----------------------|---------------------------|---------------------------|---------------------------|------------------|
| | Under \$1,200 | \$1,200 but under \$2,000 | \$2,000 but under \$3,000 | \$3,000 but under \$5,000 | \$5,000 and over | Under \$1,200 | \$1,200 but under \$2,000 | \$2,000 but under \$3,000 | \$3,000 but under \$5,000 | \$5,000 and over |
| All operations..... | 51.98 | 55.98 | 69.83 | 66.12 | 94.48 | 319 | 802 | 698 | 334 | 439 |
| Tonsillectomy and adenoidectomy..... | 15.21 | 15.43 | 17.43 | 20.11 | 29.36 | 113 | 266 | 202 | 111 | 140 |
| Ear and mastoid operations..... | 1.34 | 2.00 | 2.18 | 2.84 | 6.45 | 11 | 38 | 27 | 16 | 30 |
| Appendectomy..... | 5.77 | 3.56 | 7.14 | 5.92 | 8.17 | 30 | 44 | 63 | 28 | 36 |
| Miscellaneous other abdominal operations..... | 4.14 | 3.93 | 4.32 | 3.67 | 6.28 | 19 | 40 | 33 | 16 | 29 |
| Lancing of boil or abscess..... | 1.42 | 1.48 | 2.84 | 2.05 | 3.62 | 8 | 20 | 27 | 10 | 17 |
| Removal of tumors (except of the female genital organs)..... | 1.43 | 1.60 | 5.10 | 3.20 | 8.68 | 7 | 18 | 43 | 15 | 42 |
| Operations on the female genital organs (per 1,000 females)..... | 7.21 | 12.96 | 12.62 | 9.11 | 10.65 | 18 | 84 | 62 | 25 | 27 |
| Circumcision ² (per 1,000 males)..... | 1.74 | 2.62 | 4.86 | 3.04 | 2.73 | 9 | 31 | 36 | 9 | 6 |
| Bone set..... | 8.89 | 7.43 | 8.13 | 6.55 | 5.56 | 55 | 102 | 78 | 32 | 26 |
| Operations on injuries (except setting of bone)..... | 3.89 | 6.05 | 6.17 | 5.53 | 9.00 | 22 | 80 | 58 | 32 | 42 |
| Miscellaneous other operations..... | 5.07 | 6.40 | 7.73 | 8.43 | 9.51 | 27 | 79 | 69 | 40 | 44 |
| Population..... | | | | | | 5,820 | 13,419 | 9,491 | 4,911 | 4,680 |

¹ Adjusted by the indirect method as described in note to table 8.

² Circumcisions under 1 year of age per 1,000 male live births:

| Annual family income | Male live births | Circumcisions under 1 year | Circumcision rate per 1,000 male live births |
|--------------------------------|------------------|----------------------------|--|
| Under \$1,200..... | 83 | 6 | 72 |
| \$1,200 but under \$2,000..... | 139 | 18 | 129 |
| \$2,000 but under \$3,000..... | 87 | 22 | 253 |
| \$3,000 but under \$5,000..... | 32 | 7 | 219 |
| \$5,000 and over..... | 19 | 3 | 158 |

of figure 10 on an actual basis, and in the upper half on a relative basis as ratios to the rate for the group with less than \$1,200 annual income. Most of the operations show some tendency toward greater frequencies in the higher income groups. The operations that show the largest and most definite differences are tonsillectomy, removal of tumors, ear and mastoid operations, and lancing of boils. These types of operations are not usually done as emergencies; the tumor category is predominated by minor external tumors that do not endanger life, and

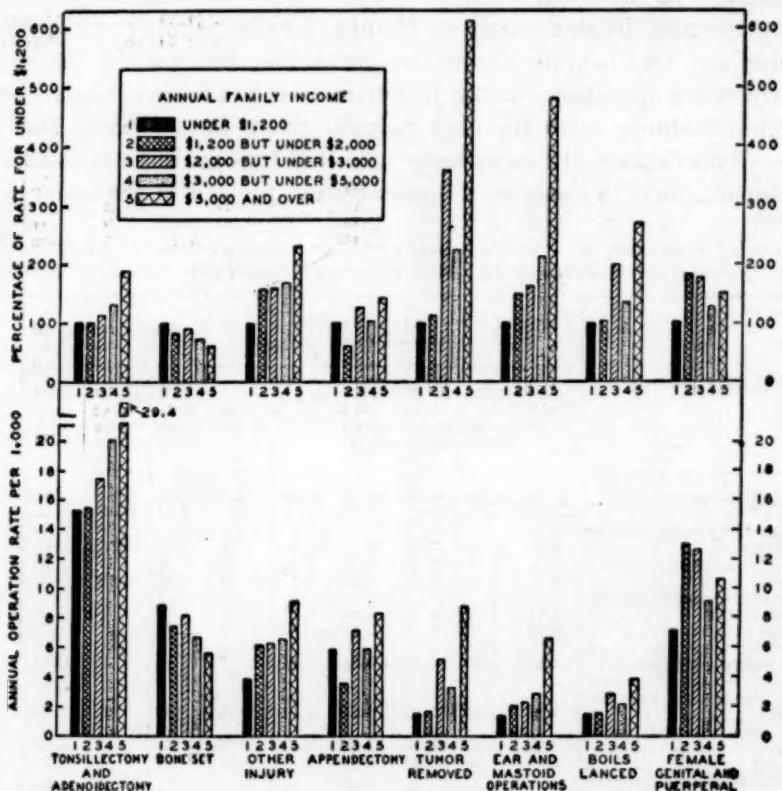


FIGURE 10.—Frequency of certain surgical operations among persons classified according to total annual family income—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31. (Rates adjusted to the age distribution of the white population of the registration States in 1930.)

the mastoid cases are a small part of the ear group. Moreover, the rupture of the ear drum in otitis media is a frequent outcome when surgical procedures are not used; by this outcome, the emergency is ended without surgery, although the result may be a permanent impairment.

Bone setting was more frequent in the lower income groups. Every fracture carries with it the implication of the setting of the bone or the placing of a cast, and so the frequency of this operation really represents the frequency of accidents involving a fracture. Since

accidents, particularly industrial accidents, occur more frequently in the lower income groups, the incidence of this operation might be expected to be less in the higher income brackets. Operations in connection with injuries, except bone setting, are more frequent in the higher income groups; but when all operations on injuries are considered together, there is not much variation with income in the rate for all ages. Among children under 20 years there are more operations in the higher income groups (table 10).

TABLE 10.—*Frequency in broad age groups of certain surgical operations among canvassed white families of different income levels in 18 States during 12 consecutive months, 1928-31*

| Diagnosis and age | Annual operation rate per 1,000 population for each income class | | | | | Number of operations | | | | |
|--|--|---------------------------|---------------------------|---------------------------|------------------|----------------------|---------------------------|---------------------------|---------------------------|------------------|
| | Under \$1,200 | \$1,200 but under \$2,000 | \$2,000 but under \$3,000 | \$3,000 but under \$5,000 | \$5,000 and over | Under \$1,200 | \$1,200 but under \$2,000 | \$2,000 but under \$3,000 | \$3,000 but under \$5,000 | \$5,000 and over |
| Tonsillectomy and adenoidectomy: | | | | | | | | | | |
| Under 20..... | 30.5 | 31.9 | 33.1 | 35.7 | 51.6 | 96 | 223 | 153 | 76 | 94 |
| 20-44..... | 8.5 | 8.6 | 11.9 | 15.9 | 20.4 | 15 | 41 | 42 | 30 | 34 |
| 45 and over..... | 2.2 | 1.3 | 5.4 | 5.9 | 7.8 | 2 | 2 | 7 | 5 | 9 |
| Appendectomy: | | | | | | | | | | |
| Under 20..... | 4.8 | 1.9 | 3.7 | 6.6 | 9.9 | 15 | 13 | 17 | 14 | 18 |
| 20-44..... | 7.4 | 5.8 | 11.9 | 6.9 | 9.0 | 13 | 28 | 42 | 13 | 15 |
| 45 and over..... | 2.2 | 1.3 | 3.1 | 1.2 | 2.6 | 2 | 2 | 4 | 1 | 3 |
| Operations on the female genital organs (per 1,000 females): | | | | | | | | | | |
| Under 20..... | .7 | .9 | | | | 1 | 3 | | | |
| 20-44..... | 16.7 | 29.3 | 29.3 | 21.9 | 25.7 | 16 | 74 | 56 | 23 | 24 |
| 45 and over..... | 2.3 | 6.8 | 10.0 | 4.9 | 5.6 | 1 | 5 | 6 | 2 | 3 |
| Operations on injuries: | | | | | | | | | | |
| Under 20..... | 13.7 | 12.5 | 16.7 | 15.0 | 20.3 | 43 | 87 | 77 | 32 | 37 |
| 20-44..... | 9.1 | 15.0 | 11.3 | 14.3 | 8.4 | 16 | 72 | 40 | 27 | 14 |
| 45 and over..... | 20.1 | 13.8 | 14.6 | 5.9 | 13.9 | 18 | 22 | 19 | 5 | 16 |
| Miscellaneous other operations: | | | | | | | | | | |
| Under 20..... | 11.5 | 16.5 | 24.9 | 17.3 | 36.2 | 36 | 115 | 115 | 37 | 66 |
| 20-44..... | 17.1 | 16.9 | 22.3 | 24.3 | 34.7 | 30 | 81 | 79 | 46 | 58 |
| 45 and over..... | 16.7 | 18.2 | 30.8 | 26.9 | 37.3 | 15 | 29 | 40 | 23 | 43 |
| Population of both sexes | | | | | | | | | | |
| Under 20..... | 3,145 | 6,639 | 4,625 | 2,132 | 1,823 | 1,529 | 3,495 | 2,307 | 1,075 | 809 |
| 20-44..... | 1,758 | 4,792 | 3,537 | 1,893 | 1,670 | 957 | 2,528 | 1,913 | 1,051 | 935 |
| 45 and over..... | 896 | 1,596 | 1,299 | 855 | 1,154 | 445 | 738 | 598 | 408 | 540 |
| Female population | | | | | | | | | | |

IV. VARIATION IN THE FREQUENCY OF SURGICAL PROCEDURES WITH SIZE OF CITY AND GEOGRAPHIC AREA

Physicians are more concentrated in large cities than is the general population; a study of 10 States by Peebles (19) indicated that 53 percent of the physicians were practicing in cities over 100,000 in population, whereas only about 40 percent of the population of these States lived in cities of that size. In addition, it was found that the percentage of practicing physicians who limited themselves to a specialty increased regularly with size of city; the percentage who

were specialists in cities over 100,000 was more than four times what it was in places under 10,000.

Hospital beds are also concentrated in large cities, with corresponding scarcity in the rural districts. Thus surgeon specialists and hospital facilities are more plentiful and more convenient to the inhabitants of large cities.

Geographically, both physicians and hospital beds are less plentiful (in proportion to population) throughout the South than in other sections.

Size of city.—Figure 11 shows surgical operation rates for cities classified according to size. Considering this chart for the whole

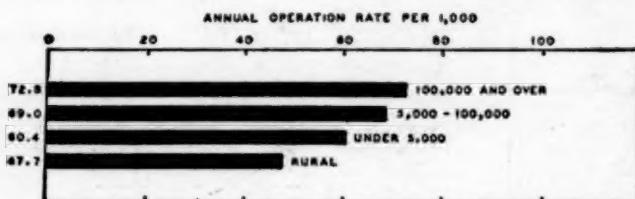


FIGURE 11.—Frequency of all surgical operations in cities of different sizes and in rural areas—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31. (Rates adjusted to the age distribution of the white population of the registration States in 1930.)

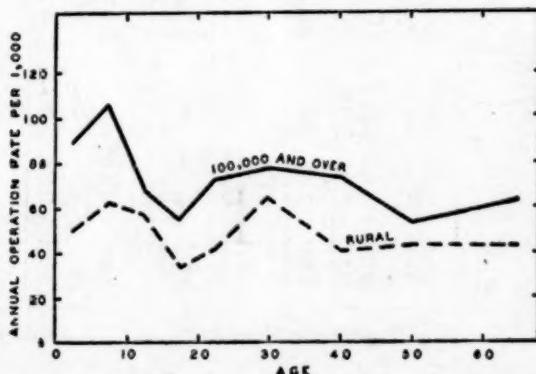


FIGURE 12.—Frequency of all surgical operations among persons of specific ages in large cities and in rural areas—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31.

group of families, there is a regular progression from an operation rate of 48 in the rural areas to 73 per 1,000 in cities of 100,000 or more population. In table 11 these rates are shown for persons of specific ages. The variations among cities of different sizes are not consistent in the several age groups, but the tendency toward higher rates in large cities is fairly clear. When one compares operation rates in cities of 100,000 or over with those in rural areas, as is done in figure 12, the differences between the two types of communities are large for every age group.

TABLE 11.—Frequency at specific ages of all surgical operations in cities of different sizes and in rural areas—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31

| Size of city | All ages ¹ | | | Age | | | | | | | | |
|----------------------------|-----------------------|------------------------|-------|--|-------|-------|-------|-------|-------|-------|-------|-------------|
| | Number of operations | Ad-justed ² | Crude | Under 5 | 5-9 | 10-14 | 15-19 | 20-24 | 25-34 | 35-44 | 45-54 | 55 and over |
| | | | | Annual operation rate per 1,000 population | | | | | | | | |
| Cities of 100,000 or over | 1,093 | 72.8 | 76.2 | 88.6 | 106.3 | 67.8 | 54.0 | 72.6 | 77.7 | 72.9 | 52.9 | 62.8 |
| Cities 5,000-100,000 | 707 | 69.0 | 72.9 | 71.7 | 107.5 | 70.5 | 62.0 | 77.2 | 73.3 | 64.8 | 41.1 | 58.6 |
| Towns under 5,000 | 483 | 60.4 | 63.7 | 61.7 | 78.4 | 62.7 | 57.9 | 61.3 | 80.3 | 60.9 | 43.1 | 43.9 |
| Rural areas | 340 | 47.7 | 49.2 | 49.9 | 62.7 | 56.4 | 33.6 | 41.3 | 64.6 | 39.8 | 43.1 | 42.2 |
| Population (years of life) | | | | | | | | | | | | |
| Cities of 100,000 or over | 14,351 | — | — | 1,963 | 1,994 | 1,578 | 1,037 | 868 | 2,369 | 2,303 | 1,248 | 907 |
| Cities 5,000-100,000 | 9,604 | — | — | 1,535 | 1,517 | 1,106 | 758 | 505 | 1,432 | 1,512 | 803 | 495 |
| Towns under 5,000 | 7,585 | — | — | 1,134 | 1,199 | 909 | 570 | 359 | 1,096 | 1,134 | 627 | 824 |
| Rural areas | 6,914 | — | — | 881 | 1,005 | 975 | 685 | 387 | 743 | 981 | 673 | 545 |

¹ "All ages" includes a few of unknown age.

² Adjusted by the *indirect* method as described in note to table 8.

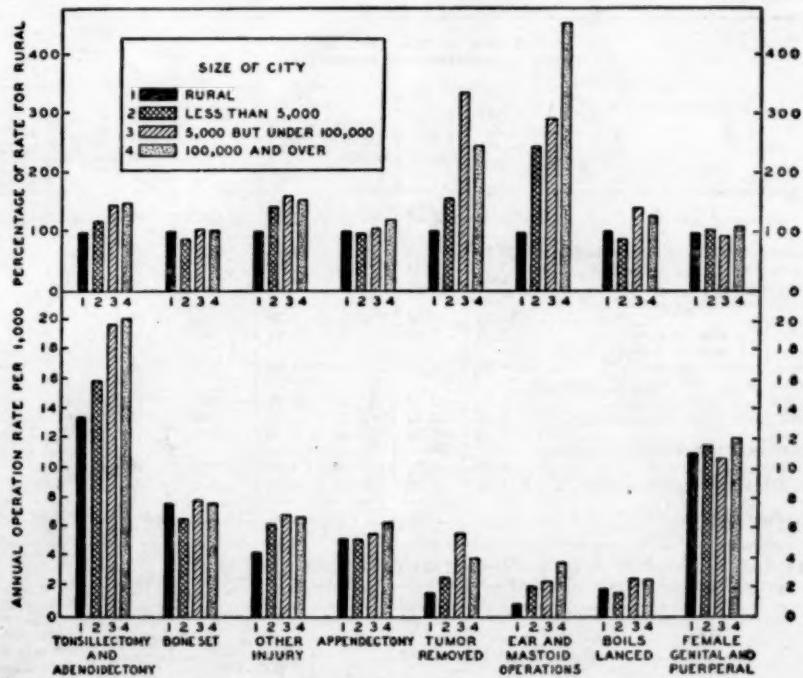


FIGURE 13.—Frequency of certain surgical operations in cities of different sizes and in rural areas—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31. (Rates adjusted to the age distribution of the white population of the registration States in 1930.)

Table 12 and figure 13 show rates for specific kinds of operations in the several types of communities. Most of the operations show tendencies toward higher rates in large cities, but the variations are

not equally large and consistent for the several diagnoses. Tonsillectomy shows a regular progression from 13 per 1,000 in the rural areas to 20 per 1,000 in large cities, but for appendectomy there is much less difference between the country and the city. Possibly appendicitis represents an emergency which must be taken care of, but tonsillectomies are performed more frequently when facilities are available and convenient. The sizable excess in cities for operations to remove benign tumors, cysts, and warts seems to bear out this hypothesis, since such chronic conditions rarely come up as emergency situations. On the other hand, operations in connection with ear and mastoid diseases show a large relative excess for cities, and one would think that many of these operations would be done as emergencies. It is an emergency, however, that is often overlooked, and the eardrum is left to rupture without surgical interference. It seems hardly probable that the difference between urban and rural operation rates reflects only the need for such surgery.

TABLE 12.—*Frequency of certain surgical operations in cities of different sizes and in rural areas—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

| Nature of operation | Annual operation rate per 1,000 population (age adjusted ¹) | | | | Number of operations | | | |
|--|---|----------------------|-------------------|-------------|---------------------------|----------------------|-------------------|-------------|
| | Cities of 100,000 or over | Cities 5,000–100,000 | Towns under 5,000 | Rural areas | Cities of 100,000 or over | Cities 5,000–100,000 | Towns under 5,000 | Rural areas |
| All operations..... | 72.78 | 68.97 | 60.39 | 47.69 | 1,093 | 707 | 483 | 340 |
| Tonsillectomy and adenoidectomy..... | 20.18 | 19.80 | 15.90 | 13.49 | 342 | 240 | 150 | 113 |
| Ear and mastoid operations..... | 3.61 | 2.34 | 1.96 | .80 | 65 | 31 | 20 | 7 |
| Appendectomy..... | 6.26 | 5.55 | 5.11 | 5.17 | 85 | 49 | 35 | 33 |
| Miscellaneous other abdominal operations..... | 5.32 | 4.99 | 2.93 | 3.50 | 64 | 38 | 18 | 20 |
| Lancing of boil or abscess..... | 2.35 | 2.59 | 1.61 | 1.83 | 34 | 25 | 12 | 12 |
| Removal of tumors (except of the female genital organs)..... | 4.00 | 5.46 | 2.55 | 1.63 | 52 | 46 | 17 | 10 |
| Operations on the female genital organs (per 1,000 females)..... | 11.95 | 10.55 | 11.51 | 10.98 | 92 | 51 | 43 | 33 |
| Circumcision ² (per 1,000 males)..... | 3.63 | 3.37 | 2.23 | 2.99 | 38 | 27 | 14 | 15 |
| Bone set..... | 7.72 | 7.92 | 6.65 | 7.59 | 111 | 78 | 52 | 55 |
| Operations on injuries (except setting of bone)..... | 6.65 | 6.01 | 6.15 | 4.29 | 95 | 66 | 46 | 29 |
| Miscellaneous other operations..... | 8.40 | 6.22 | 10.71 | 2.04 | 115 | 56 | 76 | 13 |
| Population (years of life)..... | ----- | ----- | ----- | ----- | 14,351 | 9,694 | 7,585 | 6,914 |

¹ Adjusted by the *indirect* method as described in note to table 8.

² Circumcisions under 1 year of age per 1,000 male live births:

| Size of city | Male live births | Circumcisions under 1 year | Circumcision rate per 1,000 male live births |
|--------------------------------|------------------|----------------------------|--|
| Cities of 100,000 or over..... | 135 | 25 | 185 |
| Cities 5,000–100,000..... | 94 | 14 | 149 |
| Towns under 5,000..... | 81 | 9 | 111 |
| Rural areas..... | 53 | 8 | 151 |
| All communities..... | 363 | 56 | 154 |

Operations on the female genital organs are often done in connection with conditions that resulted from childbirth; because the birth rate is higher in rural areas the need for such surgery is probably greater there, but the operation rates in table 12 show little variation with size of city.

TABLE 13.—*Frequency in broad age groups of certain surgical operations in cities of different sizes and in rural areas—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31*

| Diagnosis and age | Annual operation rate per 1,000 population | | | | Number of operations | | | |
|---|--|----------------------|-------------------|-------------|---------------------------|----------------------|-------------------|-------------|
| | Cities of 100,000 or over | Cities 5,000-100,000 | Towns under 5,000 | Rural areas | Cities of 100,000 or over | Cities 5,000-100,000 | Towns under 5,000 | Rural areas |
| Tonsillectomy and adenoidectomy: | | | | | | | | |
| Under 20..... | 39.0 | 38.2 | 30.7 | 25.9 | 256 | 188 | 117 | 92 |
| 20-44..... | 13.9 | 12.2 | 10.4 | 8.1 | 77 | 42 | 27 | 17 |
| 45 and over..... | 3.2 | 6.9 | 5.2 | 3.3 | 7 | 9 | 6 | 4 |
| Appendectomy: | | | | | | | | |
| Under 20..... | 4.1 | 4.1 | 3.4 | 5.1 | 27 | 20 | 13 | 18 |
| 20-44..... | 9.7 | 7.5 | 8.1 | 4.7 | 54 | 26 | 21 | 10 |
| 45 and over..... | 1.9 | 1.5 | .9 | 4.1 | 4 | 2 | 1 | 5 |
| Operations on the female genital organs (per 1,000 females): | | | | | | | | |
| Under 20..... | .6 | .4 | .5 | — | 2 | 1 | 1 | — |
| 20-44..... | 27.3 | 25.7 | 28.1 | 23.1 | 82 | 48 | 40 | 26 |
| 45 and over..... | 6.6 | 1.7 | 3.6 | 12.8 | 7 | 1 | 2 | 7 |
| Operations on injuries: | | | | | | | | |
| Under 20..... | 14.8 | 18.5 | 13.4 | 11.0 | 97 | 91 | 51 | 39 |
| 20-44..... | 13.2 | 11.3 | 12.0 | 13.7 | 73 | 39 | 31 | 29 |
| 45 and over..... | 16.2 | 10.0 | 13.9 | 13.1 | 35 | 13 | 16 | 16 |
| Miscellaneous other operations: | | | | | | | | |
| Under 20..... | 25.4 | 19.9 | 18.9 | 10.2 | 167 | 98 | 72 | 36 |
| 20-44..... | 23.3 | 25.2 | 23.2 | 9.9 | 129 | 87 | 60 | 21 |
| 45 and over..... | 32.5 | 28.5 | 21.7 | 16.4 | 70 | 37 | 25 | 20 |
| | | | | | | | | |
| Population of both sexes | | | | | | | | |
| Under 20..... | 6,572 | 4,916 | 3,812 | 3,546 | 3,325 | 2,447 | 1,904 | 1,693 |
| 20-44..... | 5,540 | 3,449 | 2,589 | 2,111 | 3,002 | 1,866 | 1,421 | 1,125 |
| 45 and over..... | 2,155 | 1,298 | 1,151 | 1,218 | 1,056 | 578 | 555 | 547 |

Size of city and income.—Surgical operation rates are higher in large cities than in rural areas; they are also higher in families with larger incomes. Since the higher income families tend to be concentrated in large cities, it is necessary to consider size of city and family income simultaneously to see whether both factors are related to the operation rate. It was feasible in this study to do this by computing operation rates for families of different incomes in cities of specific sizes.

Figure 14 shows, for families of given income levels, operation rates for those that live in small towns and rural areas as compared with those in cities of two sizes (table 14). Thus the top three bars in figure 14 indicate that among families with annual incomes of \$5,000 or more the frequency of surgical operations is nearly twice as high in cities over 100,000 as in rural areas. Also for families in the lowest income group, under \$1,200 per annum, there is a large excess in the

frequency of operations in large cities over that in small towns and rural areas. In both the high and low income groups the differences between the rates for large cities and for towns and rural areas are statistically significant; that is, they are larger than would be expected to occur by chance. In the intervening three income groups there is a fairly consistent tendency toward higher operation rates in the cities, but the differences are small and not statistically significant.

The data in figure 14 suggest that among families with sufficient income to pay for needed operations, the service is obtained more frequently in large cities where surgeons and hospital facilities are conveniently near. Persons in the lowest income group that live in

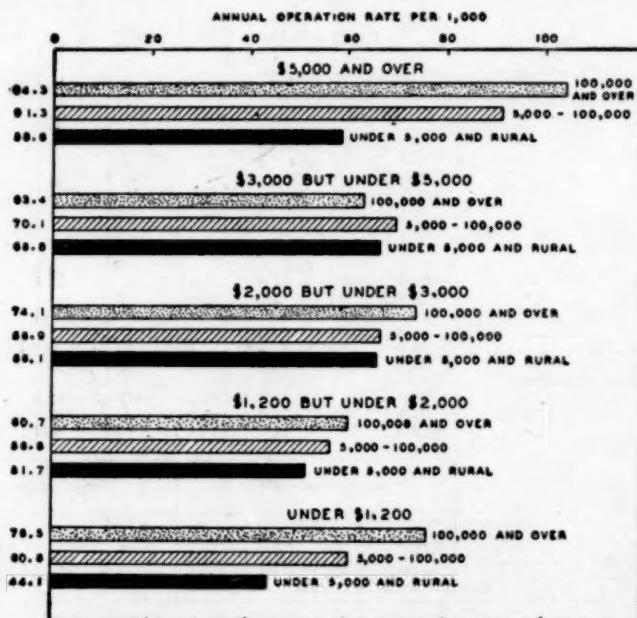


FIGURE 14.—Frequency of all surgical operations in cities of different sizes among persons classified according to total annual family income—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31. (Rates adjusted to the age distribution of the white population of the registration States in 1930.)

large cities likewise obtain more surgical treatment, presumably because of the availability of at least a certain amount of free clinic and hospital service near at hand. In the three intervening income groups the convenience of facilities for surgical service in large cities does not greatly increase the frequency of operations because these families have incomes high enough to make them ineligible for free clinic and hospital service but not high enough to pay for surgery and the necessary hospital and nursing care that goes with it. While the need for surgical treatment may vary with size of city and family income, the differences noted above do not seem to be explained by variation in the need for surgery.

If one compares the bars in the various parts of figure 14, it is seen that the operation rate is lowest for low income rural families; however, the low income city families get as much surgical treatment as any group except city families with \$5,000 incomes. While the recorded rate for high income rural families is less than for low income urban families, the numbers are small and the two rates are not significantly different. From table 15 it is seen that the frequency of operations for city families with incomes under \$2,000 is practically the same as for rural families with annual incomes of \$3,000 or more (62.9 and 64.6 per 1,000, respectively).

TABLE 14.—*Frequency of all surgical operations among canvassed white families of different income levels in metropolitan, urban, and rural parts of 18 States during 12 consecutive months, 1928-31*

| Operation group and size of city | Annual operation rate per 1,000 population (age adjusted ¹) | | | | | Number of operations | | | | |
|---|---|---------------------------|---------------------------|---------------------------|------------------|----------------------|---------------------------|---------------------------|---------------------------|------------------|
| | Under \$1,200 | \$1,200 but under \$2,000 | \$2,000 but under \$3,000 | \$3,000 but under \$5,000 | \$5,000 and over | Under \$1,200 | \$1,200 but under \$2,000 | \$2,000 but under \$3,000 | \$3,000 but under \$5,000 | \$5,000 and over |
| All operations: | | | | | | | | | | |
| Cities of 100,000 or over | 76.5 | 60.7 | 74.1 | 63.4 | 104.3 | 61 | 305 | 326 | 152 | 248 |
| Cities 5,000-100,000 | 60.8 | 56.8 | 66.9 | 70.1 | 91.3 | 82 | 177 | 178 | 96 | 162 |
| Towns under 5,000 and rural areas | 44.1 | 51.7 | 66.1 | 60.8 | 58.8 | 176 | 320 | 194 | 86 | 29 |
| All operations except male and female genital and puerperal: | | | | | | | | | | |
| Cities of 100,000 or over | 68.4 | 51.8 | 63.8 | 56.2 | 97.3 | 55 | 259 | 280 | 134 | 231 |
| Cities 5,000-100,000 | 53.8 | 50.6 | 59.3 | 62.7 | 82.1 | 73 | 157 | 157 | 86 | 148 |
| Towns under 5,000 and rural areas | 39.9 | 42.7 | 55.3 | 60.9 | 52.1 | 161 | 266 | 163 | 79 | 26 |
| Population: | | | | | | | | | | |
| Cities of 100,000 or over | | | | | | 772 | 4,675 | 4,166 | 2,334 | 2,389 |
| Cities 5,000-100,000 | | | | | | 1,236 | 2,873 | 2,490 | 1,314 | 1,805 |
| Towns under 5,000 and rural areas | | | | | | 3,812 | 5,871 | 2,835 | 1,263 | 405 |

¹ Adjusted by the *indirect* method as described in note to table 8.

Table 15 also shows rates for each of seven kinds of operations. In every instance in which there was a definite increase with income in the frequency of surgical treatment when size of city was disregarded, the increase persists in each of the three city-rural classes. The relative differences between income groups are particularly large for the removal of tumors and ear operations.

Geographic area.—The frequency of operations as reported in this study varies in different geographic areas as well as in cities of different sizes. Considering surgical treatment of all kinds, the West reported the highest frequency and the Northeast the lowest; the South and North Central were intermediate and had approximately the same rates. When the rates are considered for persons of different ages,

TABLE 15.—*Frequency of certain surgical operations among canvassed white families of different annual incomes in metropolitan, urban, and rural parts of 18 States during 12 consecutive months, 1928–31*

| Nature of operation | Cities of 100,000 or over | | | Cities of 5,000–10,000 | | | Towns under 5,000 and rural areas | | |
|---|---------------------------------------|---------------------------------|---------------------|------------------------|---------------------------------|---------------------|-----------------------------------|---------------------------------|---------------------|
| | Under \$2,000 but under \$3,000 | \$2,000 but under \$3,000 | \$3,000 and over | Under \$2,000 | \$2,000 but under \$3,000 | \$3,000 and over | Under \$2,000 | \$2,000 but under \$3,000 | \$3,000 and over |
| Annual operation rate per 1,000 population (age adjusted ¹) | | | | | | | | | |
| All operations..... | 62.9 | 74.1 | 83.8 | 58.0 | 66.9 | 82.1 | 48.8 | 66.1 | 64.6 |
| Tonsillectomy and adenoidectomy..... | 17.8 | 18.8 | 25.1 | 15.6 | 18.2 | 26.2 | 13.9 | 14.6 | 19.4 |
| Ear and mastoid operations..... | 2.7 | 2.6 | 6.1 | 1.9 | 2.3 | 3.2 | 1.2 | 1.4 | 2.5 |
| Appendectomy..... | 4.4 | 8.1 | 6.8 | 4.0 | 5.7 | 7.3 | 4.2 | 6.9 | 7.2 |
| Lancing of boil or abscess..... | 1.8 | 2.4 | 3.0 | 1.7 | 2.0 | 4.4 | 1.2 | 4.4 | ----- |
| Removal of tumors (except of the female genital organs)..... | 1.3 | 4.9 | 5.9 | 2.5 | 6.5 | 7.8 | 1.3 | 4.2 | 3.0 |
| Operations on the female genital organs (per 1,000 females)..... | 12.1 | 13.3 | 10.7 | 10.8 | 9.2 | 10.2 | 11.1 | 14.7 | 6.7 |
| Operations on injuries..... | 13.2 | 15.1 | 15.2 | 16.7 | 14.5 | 12.1 | 12.0 | 13.0 | 13.1 |
| Number of operations | | | | | | | | | |
| All operations..... | 366 | 326 | 400 | 259 | 178 | 258 | 496 | 194 | 115 |
| Tonsillectomy and adenoidectomy..... | 123 | 96 | 123 | 87 | 57 | 90 | 160 | 49 | 38 |
| Ear and mastoid operations..... | 21 | 14 | 30 | 12 | 8 | 11 | 16 | 5 | 5 |
| Appendectomy..... | 22 | 32 | 31 | 15 | 13 | 21 | 37 | 18 | 12 |
| Lancing of boil or abscess..... | 10 | 10 | 14 | 7 | 5 | 13 | 11 | 12 | ----- |
| Removal of tumors (except of the female genital organs)..... | 6 | 18 | 28 | 8 | 14 | 24 | 11 | 11 | 5 |
| Operations on the female genital organs (female)..... | 33 | 29 | 30 | 21 | 12 | 16 | 48 | 21 | 6 |
| Operations on injuries..... | 72 | 63 | 71 | 69 | 36 | 38 | 118 | 37 | 23 |
| Population | | | | | | | | | |
| Both sexes..... | 5,447 | 4,166 | 4,723 | 4,109 | 2,490 | 3,110 | 9,683 | 2,835 | 1,758 |
| Female..... | 2,794 | 2,142 | 2,515 | 2,095 | 1,247 | 1,549 | 4,837 | 1,448 | 887 |

¹ Adjusted by the *indirect* method as described in note to table 8.

there is no one section which stands out as consistently higher than the others.

Considering the various kinds of operations in the four geographic areas (table 16), the larger differences tend to occur in the minor operations and may be due in part to variation in the completeness of the family reports. For example, the tonsillectomy rate varies from 14 per 1,000 in the Northeast to 22 per 1,000 in the West, and circumcisions under 1 year of age per 1,000 male live births vary from 78 in the Northeast to 286 in the West. The rate in the West is also particularly high for the removal of benign tumors and for ear and mastoid operations.

April 22, 1938

TABLE 16.—*Frequency of certain surgical operations in 4 geographic sections¹—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

| Nature of operation | Annual operation rate per 1,000 population (age adjusted ²) | | | | Number of operations | | | |
|---|---|---------------|-------|-------|----------------------|---------------|-------|-------|
| | North-east | North Central | South | West | North-east | North Central | South | West |
| All operations | 58.35 | 62.79 | 63.26 | 79.24 | 547 | 900 | 517 | 509 |
| Tonsillectomy and adenoidectomy | 13.68 | 19.32 | 17.18 | 21.79 | 146 | 349 | 168 | 182 |
| Ear and mastoid operations | 2.45 | 1.96 | 1.88 | 4.22 | 28 | 38 | 20 | 37 |
| Appendectomy | 6.48 | 4.94 | 6.38 | 5.40 | 53 | 66 | 46 | 37 |
| Miscellaneous other abdominal operations | 3.86 | 5.03 | 4.38 | 4.16 | 30 | 57 | 26 | 27 |
| Lancing of boil or abscess | 2.84 | 2.08 | 1.83 | 1.94 | 25 | 30 | 14 | 14 |
| Removal of tumors (except of the female genital organs) | 3.15 | 3.44 | 2.76 | 5.48 | 26 | 43 | 18 | 38 |
| Operations on the female genital organs (per 1,000 females) | 10.57 | 9.22 | 14.78 | 13.02 | 47 | 67 | 55 | 50 |
| Circumcision ³ (per 1,000 males) | 1.44 | 2.84 | 2.89 | 6.64 | 10 | 33 | 18 | 33 |
| Bone set | 7.66 | 7.09 | 8.04 | 7.73 | 71 | 104 | 64 | 57 |
| Operations on injuries (except setting of bone) | 5.28 | 7.22 | 5.27 | 6.31 | 47 | 103 | 40 | 46 |
| Miscellaneous other operations | 7.45 | 5.22 | 6.79 | 11.05 | 64 | 70 | 48 | 78 |
| Population (years of life) | | | | | 9,043 | 14,413 | 7,741 | 7,347 |

¹ States included in the survey were as follows: *Northeast*.—New York, Massachusetts, Connecticut; *North Central*.—Illinois, Ohio, Michigan, Indiana, Wisconsin, Minnesota, Kansas; *South*.—District of Columbia, Virginia, West Virginia, Tennessee, Georgia; *West*.—Washington, California, Colorado.

² Adjusted by the *indirect* method as described in note to table 8.

³ Circumcisions under 1 year of age per 1,000 male live births:

| Geographic section | Male live births | Circumcisions under 1 year | Circumcision rate per 1,000 male live births |
|--------------------|------------------|----------------------------|--|
| Northeast | 77 | 6 | 78 |
| North Central | 151 | 16 | 106 |
| South | 65 | 14 | 215 |
| West | 70 | 20 | 286 |

Size of city and geographic area.—Figure 15 shows operation rates for cities of different sizes in each of the four geographic areas considered above. In each region the rates for rural areas and for towns under 5,000 are lower than in cities of 5,000 and over; the differences between the low rural rate and the highest city rate are statistically significant for every section. In the Northeast and North Central regions, where the great bulk of the large cities are located, the observed operation rates in cities over 100,000 are slightly but not significantly less than in cities of 5,000 to 100,000 population. In these sections a larger percentage of the population lives within a convenient distance of the facilities of large cities, so less difference between the rates for urban and rural places might be expected, even with equal need for surgical treatment. However, there seems to be no reasonable explanation, in terms of either need or facilities, for the high rates reported for all types of communities in the West and for large cities in the South.

V. SEVERITY AND MEDICAL CARE OF SURGICAL CASES

Hospital, clinic, and specialist services.—Table 17 includes data on the kind of service received in connection with each of the 26 more or less specific types of operations. Considering all surgical treatment, 61 percent of the cases had some hospital service, and presumably the operation was done in the hospital. Of the 39 percent that had no hospital service, 30 percent of all operations had only office or clinic calls, with no home calls, and so the operation must have been done in the office or clinic; the other 9 percent had home calls but no hospital service, and so the operation was done either at home or in the office or clinic.

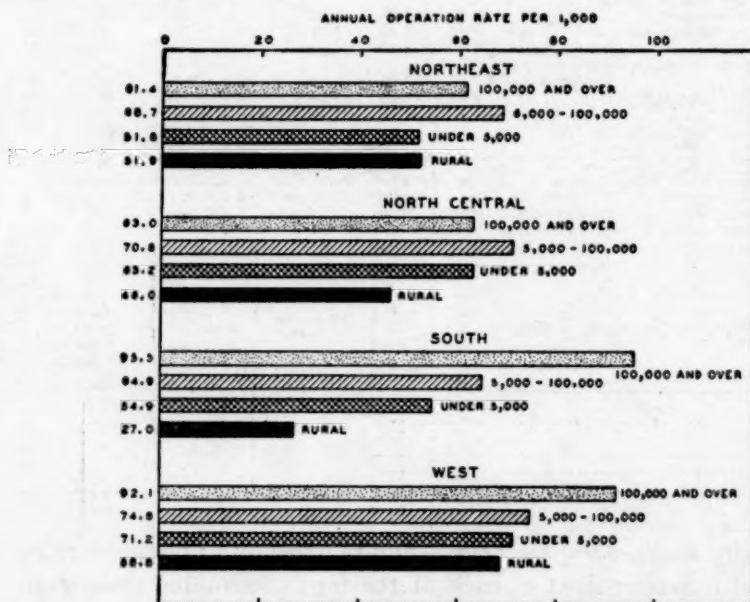


FIGURE 15.—Frequency of all surgical operations in cities of different sizes and in rural areas in each of four geographic sections of the United States—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31. (Rates adjusted to the age distribution of the white population of the registration States in 1930.)

All operations for gall bladder, hernia, and thyroid and all hysterectomies were hospital cases. Other operations in which 90 percent or more of the cases had hospital service were appendectomy, 99 percent; mastoid, 95; tumors of the female genital organs, 94; and repair of lacerations following childbirth, 92 percent. At the other extreme, only 12 percent of the ear punctures had hospital service and 45 percent had office calls only. Seventeen percent of the operations on boils and abscesses were done in the hospital, but 63 percent had only office calls. Considering all operations in connection with accidents, 27 percent had hospital service; the range for the various types of

TABLE 17.—*Place of treatment and type of service for surgical cases of certain kinds—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

| Nature of operation | All operations | | | | | Hospital operations | | |
|--|----------------|--|------------------------------------|-----------------------------|------------------------------------|---|--------------|---|
| | Total number | Percentage with specified medical care | | | | Percentage specified as done by a specialist ¹ | Total number | Percentage specified as done by a specialist ² |
| | | Hospital service | Home calls but no hospital service | Office or clinic calls only | Public clinic service ¹ | | | |
| All operations..... | 2,623 | 60.8 | 9.4 | 29.8 | 10.1 | 43 | 1,506 | 53 |
| Tonsillectomy and adenoidectomy..... | 845 | 75.1 | 2.4 | 22.5 | 12.7 | 50 | 635 | 54 |
| Sinus and nose operations..... | 50 | 64.0 | 4.0 | 32.0 | 6.0 | 82 | 32 | 94 |
| Ear drum punctured..... | 84 | 11.9 | 42.9 | 45.2 | 17.9 | 68 | 10 | 70 |
| Mastoidectomy..... | 39 | 94.9 | 5.1 | — | 10.3 | 82 | 37 | 81 |
| Cervical or other lymphatic gland operations..... | 26 | 38.5 | 30.8 | 30.8 | 11.5 | 38 | 10 | 50 |
| Thyroid operations..... | 19 | 100.0 | — | — | 15.8 | 74 | 19 | 74 |
| Appendectomy..... | 202 | 99.0 | 1.0 | — | 1.5 | 54 | 200 | 55 |
| Hernia operations..... | 43 | 100.0 | — | — | 4.7 | 53 | 43 | 53 |
| Gall bladder operations..... | 31 | 100.0 | — | — | 6.5 | 74 | 31 | 74 |
| Miscellaneous other abdominal operations..... | 66 | 89.4 | 1.5 | 9.1 | 6.1 | 67 | 59 | 60 |
| Hemorrhoid operations..... | 20 | 70.0 | — | 30.0 | 15.0 | 55 | 14 | 57 |
| Operations on bones, joints, and other organs of locomotion..... | 40 | 72.5 | 5.0 | 22.5 | 15.0 | 50 | 29 | 62 |
| Lancing of boil or abscess..... | 83 | 16.9 | 20.5 | 62.7 | 2.4 | 14 | 14 | 29 |
| Cancer operations..... | 21 | 85.7 | — | 14.3 | 4.8 | 76 | 18 | 78 |
| Removal of tumors (except of the female genital organs)..... | 125 | 23.2 | 3.2 | 73.6 | 4.8 | 43 | 29 | 59 |
| Removal of tumors of the female genital organs..... | 48 | 93.7 | 2.1 | 4.2 | 8.3 | 46 | 45 | 47 |
| Hysterectomy..... | 31 | 100.0 | — | — | 3.2 | 65 | 31 | 65 |
| Dilatation and curettage..... | 38 | 78.9 | 18.4 | 2.6 | 2.6 | 34 | 30 | 37 |
| Repair of childbirth injuries..... | 36 | 91.7 | 5.6 | 2.8 | 13.9 | 53 | 33 | 65 |
| Miscellaneous other operations on the female genital organs..... | 66 | 65.2 | 12.1 | 22.7 | 4.5 | 33 | 43 | 42 |
| Circumcision..... | 94 | 40.4 | 24.5 | 35.1 | 6.4 | 11 | 38 | 16 |
| Bone set..... | 296 | 26.7 | 21.3 | 52.0 | 13.5 | 14 | 70 | 22 |
| Rib strapped, dislocation reduced..... | 50 | 10.0 | 26.0 | 64.0 | 4.0 | 6 | 5 | 40 |
| Suturing of cuts and lacerations..... | 70 | 25.7 | 10.0 | 64.3 | 24.3 | 19 | 18 | 39 |
| Operations on infected wounds..... | 49 | 32.7 | 12.2 | 55.1 | 14.3 | 16 | 16 | 25 |
| Miscellaneous other operations on injuries..... | 67 | 40.3 | 13.4 | 46.3 | 16.4 | 30 | 27 | 37 |
| Miscellaneous other operations..... | 84 | 60.7 | 15.5 | 23.8 | 6.0 | 52 | 51 | 50 |

¹ Includes all public clinic service with or without hospital or other service.

² Specialist includes all types and surgeons not otherwise designated; it does not include hospital or clinic staff with no information as to whether specialists.

accident was from 26 to 40 percent, except 10 percent for operations to strap a rib or reduce a dislocation.

The figure of 61 percent of surgical cases that were hospitalized may be contrasted with 3.4 percent of all nonsurgical cases; 4.4 percent of nonsurgical cases that had a doctor in attendance were hospitalized. Of interest also is the fact that 60 percent of all hospital cases had surgical operations, as compared with 3.2 percent of all nonhospital cases; 4.2 percent of nonhospital cases that had a doctor in attendance had an operation. Hospitalization is frequent in surgical practice and surgery looms larger in hospital than in nonhospital medical practice.

Of the 1,596 operations of all kinds with hospital service, 92 percent were in general hospitals; 1.8 percent in children's hospitals; 1.1 in eye, ear, nose and throat hospitals; 0.6 in women's hospitals; and the remaining 4.5 percent were in other or unspecified types of hospitals. About 33 percent of the surgical cases were in a general ward, 22 percent in a semiprivate ward, and 45 percent in a private room. The variation in these figures from one kind of operation to another is not great; the only ones that stand out as different are circumcision, 55 percent in general wards; operations in connection with injuries, 46 percent in general wards; and tonsil and adenoid operations, 38 percent in general wards.

Of all surgical cases, 10.1 percent received some service from a public clinic in connection with the illness, as compared with 3.3 percent for all nonsurgical cases, and with 4.3 percent for nonsurgical cases that had an attendant. Of the total of 266 surgical cases that received some clinic service, 35 percent designated the organization as a general clinic, 12 percent as an eye, ear, nose, or throat clinic, 3.4 percent as a children's clinic, 1.1 percent a woman's clinic, and 4.1 percent as other known types of clinics. The remaining 45 percent of the cases that had clinic service had hospital service also, and the type of the clinic was not tabulated; nearly all of such cases were in general hospitals.

Table 17 shows for each type of operation the proportion done by a specialist. In 43 percent of all the operations the surgery was reported as done by a specialist; in comparison, only 10 percent of nonsurgical attended cases had a specialist as a medical attendant. The operations may be further classified according to the nature of the specialty; 18 percent of all operations were done by eye, ear, nose, or throat specialists (chiefly tonsillectomies and ear and mastoid cases), 21 percent by surgeons not otherwise designated as to specialty, 1.0 percent by orthopedic specialists, 1.0 by gynecologists, 0.6 by internal medicine specialists, 0.4 by urologists, and 1.4 percent by other designated specialists. The other 57 percent of the operations were done by physicians not designated as specialists, including 12 percent that were done by hospitals or clinics with no other information about the person who operated. Fifty-three percent of all operations in hospitals were done by specialists, as compared with 27 percent of those done outside of hospitals. Table 17 shows for each type of operation the percent of hospital surgical cases in which the surgery was done by a specialist.

Nursing service.—Table 18 shows certain facts about nursing care in connection with the various operations. Because nursing on surgical cases was largely in the hospital, the tabulation is limited to a special nurse in the hospital. As every hospital case receives during every day in the hospital the attention of the regular floor nurse, the

table shows also the percentage of cases that were in the hospital and the average days per hospitalized case. In addition, 25 percent of the hospital surgical cases had one or more special nurses for at least one day and 9 percent had two or more special nurses (day and night) for one or more days. These percentages may be contrasted with 17 percent of nonsurgical hospital cases that had one or more special nurses and 6 percent that had two or more.

The mean duration of special nursing in the hospital was 2.9 days per hospital surgical case and 11.5 days per hospital surgical case with a special nurse.¹⁰ The proportion of hospital surgical cases that had a special nurse varies from 5 percent for circumcisions and 10 percent for tonsillectomies to 36 percent for operations on the female genital organs, 50 percent for hernia, gall bladder, and other abdominal operations, and 52 percent for appendectomies.

TABLE 18.—*Nursing service on surgical cases in a hospital—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

| Nature of operation | Number of surgical cases | | Percent of surgical cases that were in a hospital | Mean days in hospital per hospital case | Special nurse in hospital | | Percent of hospital cases that had a special nurse in the hospital | | |
|--|--------------------------|-------------|---|---|--|---|--|--------------------------|------------------------------------|
| | Total | In hospital | | | Mean days ¹ per hospital case | Mean days ¹ per hospital case with special nurse | Any special nurse | One nurse (day or night) | Two or more nurses (day and night) |
| All operations..... | 2,623 | 1,596 | 60.8 | 9.6 | 2.9 | 11.5 | 25.3 | 16.4 | 8.9 |
| All operations except male and female genital and puerperal..... | 2,300 | 1,366 | 59.4 | 9.1 | 2.6 | 10.5 | 24.4 | 15.9 | 8.5 |
| Tonsillectomy and adenoidectomy..... | 845 | 635 | 75.2 | 2.0 | .3 | 3.1 | 10.1 | 7.1 | 3.0 |
| Ear and mastoid operations..... | 123 | 47 | 38.2 | 10.4 | 7.2 | 22.7 | 31.9 | 8.5 | 23.4 |
| Appendectomy..... | 202 | 200 | 99.0 | 14.6 | 4.0 | 7.7 | 52.0 | 40.0 | 12.0 |
| Miscellaneous other abdominal operations..... | 140 | 133 | 95.0 | 10.6 | 8.6 | 17.4 | 40.6 | 27.8 | 21.8 |
| Lancing of boil or abscess..... | 83 | 14 | 16.9 | 5.6 | 3.9 | 13.5 | 28.6 | 21.4 | 7.1 |
| Removal of tumors (except of the female genital organs)..... | 125 | 29 | 23.2 | 7.3 | 2.6 | 10.9 | 24.1 | 17.2 | 6.9 |
| Operations on the female genital organs..... | 219 | 182 | 83.1 | 13.1 | 5.9 | 16.5 | 35.7 | 23.1 | 12.6 |
| Circumcision..... | 94 | 38 | 40.4 | 3.6 | .1 | 2.0 | 5.3 | 5.3 | — |
| Bone set..... | 296 | 79 | 26.7 | 22.3 | 2.5 | 10.5 | 12.7 | 8.9 | 3.8 |
| Operations on injuries (except setting of bone)..... | 230 | 66 | 28.0 | 9.1 | 1.8 | 9.2 | 19.7 | 12.1 | 7.6 |
| Miscellaneous other operations..... | 260 | 173 | 66.5 | 16.7 | 3.7 | 12.0 | 31.2 | 16.8 | 14.4 |

¹ A day of nursing refers to the work of 1 nurse during a day or night or both; 2 nurses (day and night) on the same case were counted as 2 days of nursing but 1 nurse said to be on duty both day and night was counted as only 1 day of nursing.

¹⁰ In both of these averages a day refers to the work of one nurse during a day or night or both; two nurses (day and night) on the same case were counted as two days nursing, but one nurse said to be on duty both day and night was counted as only one day of nursing.

Considering all cases¹¹ without respect to hospitalization, 16.3 percent of all surgical cases had a full-time bedside nurse (graduate or practical) for one or more days, as contrasted with 2.1 percent of all nonsurgical cases. However, the services of the regular floor nurse in the hospital should be taken into account; of the total surgical cases, 61.7 percent were either in a hospital (and therefore had nursing care) or had the services of a full-time bedside nurse outside of the hospital, as contrasted with 4.9 percent for all nonsurgical cases, and with 6.3 percent for nonsurgical cases that were attended by a doctor.

Of all surgical cases, 5.0 percent had one or more visits from a visiting nurse; this may be compared with 3.7 percent of nonsurgical cases that had such service. The service on surgical cases amounted to 0.42 visit per total case and 8.5 visits per case with a visiting nurse. Nursing visits as here defined include visits for any purpose and from all types of organizations.

Durations of illness and of hospital service.—Table 19 shows for the 26 more or less specific kinds of operations the mean total duration¹² in days of sickness, the duration of days in bed, and number of days in a hospital for the illness in connection with which the surgery was performed. Since the duration of the case may have been materially increased by complicating affections, the means here shown are for illnesses with only a single diagnosis. The table also shows the percentages of cases that were in bed and that were hospitalized, together with the average duration of the bed and hospital cases in terms of bed and hospital days, respectively.

Figure 16 shows the mean duration in the hospital for hospitalized cases. Thus the cases that were not in a hospital do not enter into the computation, and for some operations (e. g., ear punctured, boil lanced, and reduction of dislocation), the hospitalized cases represent a small proportion of the total. The means thus represent the average stay in the hospital for cases that came under hospital care, or, roughly, the expectancy of hospital days for an uncomplicated surgical case of a given diagnosis.

¹¹ Inasmuch as the operations included sole, primary, and contributory diagnoses, the percentages here and in other paragraphs for nonsurgical cases also refer to all three kinds of diagnoses; the results are not essentially different when contributory diagnoses are eliminated.

¹² Theoretically, statistics on the duration of illness should exclude all incomplete cases and be based only on those closed either by death, recovery, or other discharge from the hospital or discontinuance of confinement to bed. In this study, however, the only available records were durations during the 12-month period of observation; in such data the incomplete cases represent a selected group with longer than average durations because the longer the duration the more probable it is that the case will still be sick on the closing date of the study year. On the other hand, some illnesses of short duration may represent cases with onset prior to the beginning of the study that extended only a short time within the study year.

TABLE 19.—*Mean duration of symptoms, of time in bed and of time in the hospital for certain surgical cases in which there were no complicating diagnoses—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

| Nature of operation | Number of surgical cases with only 1 diagnosis | Percent of cases that were in hospital | Mean days in hospital | | Percent of cases that were in bed | Mean days in bed | | Mean days of sickness per case (disabling and nondisabling) |
|--|--|--|-----------------------|----------------------|-----------------------------------|------------------|-----------------|---|
| | | | Per total case | Per case in hospital | | Per total case | Per case in bed | |
| All operations..... | 2,277 | 57.8 | 4.7 | 8.2 | 75.3 | 7.7 | 10.3 | 28 |
| Tonsillectomy and adenoidectomy..... | 795 | 75.2 | 1.3 | 1.7 | 96.9 | 3.0 | 3.2 | 8 |
| Sinus and nose operations..... | 42 | 61.9 | 2.8 | 4.5 | 81.0 | 5.3 | 6.6 | 31 |
| Ear drum punctured..... | 58 | 8.6 | .3 | 4.0 | 70.7 | 4.4 | 6.3 | 17 |
| Mastoidectomy..... | 29 | 96.6 | 9.3 | 9.6 | 96.6 | 14.4 | 14.9 | 52 |
| Cervical or other lymphatic gland operations..... | 20 | 40.6 | 1.2 | 3.1 | 75.0 | 9.4 | 12.5 | 44 |
| Thyroid operations..... | 19 | 100.0 | 14.1 | 14.1 | 100.0 | 15.2 | 15.2 | 85 |
| Appendectomy..... | 154 | 98.7 | 13.3 | 13.5 | 100.0 | 16.3 | 16.3 | 31 |
| Hernia operations..... | 34 | 100.0 | 14.3 | 14.3 | 100.0 | 19.1 | 19.1 | 47 |
| Gall-bladder operations..... | 23 | 100.0 | 21.6 | 21.6 | 100.0 | 24.1 | 24.1 | 67 |
| Miscellaneous other abdominal operations..... | 52 | 88.5 | 17.3 | 19.6 | 94.2 | 19.8 | 20.5 | 63 |
| Hemorrhoid operations..... | 15 | 73.3 | 8.5 | 11.6 | 80.0 | 10.3 | 12.8 | 54 |
| Operations on bones, joints, and other organs of locomotion..... | 37 | 70.3 | 19.0 | 27.1 | 73.0 | 36.4 | 49.8 | 105 |
| Lancing of boil or abscess..... | 76 | 13.2 | .7 | 5.2 | 39.5 | 1.8 | 4.6 | 22 |
| Cancer operations..... | 15 | 80.0 | 19.7 | 24.6 | 80.0 | 20.1 | 25.2 | 201 |
| Removal of tumors (except of the female genital organs)..... | 114 | 18.4 | 1.1 | 6.0 | 24.6 | 1.6 | 6.5 | 24 |
| Removal of tumors of the female genital organs..... | 23 | 87.0 | 14.5 | 16.7 | 95.7 | 21.3 | 22.2 | 54 |
| Hysterectomy..... | 24 | 100.0 | 16.3 | 16.3 | 100.0 | 26.3 | 26.3 | 91 |
| Dilatation and curettage..... | 32 | 78.1 | 4.5 | 5.8 | 96.9 | 10.1 | 10.4 | 39 |
| Repair of childbirth injuries..... | 11 | 81.8 | 10.3 | 12.6 | 90.9 | 12.8 | 14.1 | 74 |
| Miscellaneous other operations on the female genital organs..... | 60 | 61.7 | 5.6 | 9.1 | 80.0 | 10.4 | 13.0 | 32 |
| Circumcision..... | 80 | 35.0 | 1.2 | 3.3 | 71.2 | 2.4 | 3.3 | 7 |
| Bone set..... | 282 | 24.5 | 5.1 | 20.7 | 40.4 | 10.3 | 25.4 | 43 |
| Rib strapped, dislocation reduced..... | 48 | 10.4 | .6 | 6.0 | 31.2 | 1.3 | 4.1 | 21 |
| Suturing of cuts and lacerations..... | 68 | 23.5 | .8 | 3.4 | 45.6 | 2.8 | 6.1 | 14 |
| Operations on infected wounds..... | 44 | 29.6 | 2.0 | 6.9 | 38.6 | 3.5 | 9.1 | 33 |
| Miscellaneous other operations on injuries..... | 66 | 39.4 | 3.8 | 9.7 | 50.0 | 7.4 | 14.8 | 28 |
| Miscellaneous other operations..... | 56 | 46.4 | 9.0 | 19.5 | 66.1 | 14.4 | 21.7 | 36 |

At the top of the list, with an average of 27 hospital days, are operations on the bones, joints, and other organs of locomotion, including deformities, malformations, and amputations. The other three operations with hospital durations of more than 20 days are cancer, 25 days; gall bladder, 22 days; and bone set or cast placed, 21 days. At the bottom of the list appear tonsil and adenoid operations with an average hospital duration of 1.7 days. A total of 75 percent of the tonsillectomies were done in a hospital. However, of those done in a hospital, 68 percent of the patients spent only 1 day and 26 percent spent only 2 or 3 days in the hospital. Thus the very frequent operation of tonsillectomy gives rise to a low average duration for all operations, 8.2 hospital days per hospitalized case with only one diagnosis.



FIGURE 16.—Average days in the hospital for illnesses hospitalized in connection with certain surgical operations—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31. (Means are based on hospitalized cases with only one diagnosis; days in the hospital both before and after the operation are included.)

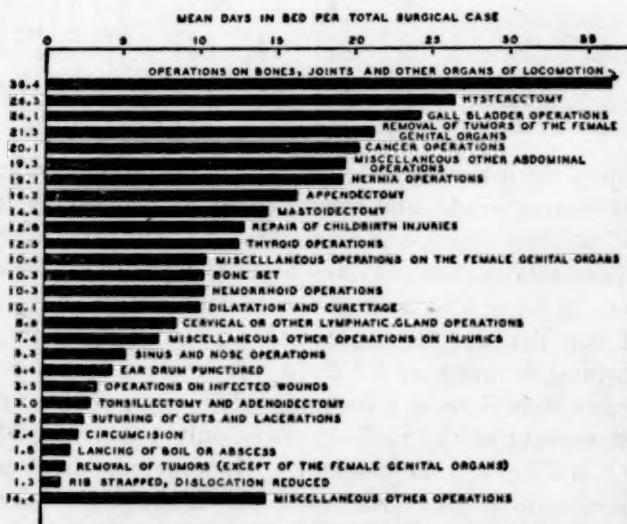


FIGURE 17.—Average days in bed on account of illness in connection with certain surgical operations—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31. (Means represent the average time in bed both before and after operation for all cases with only one diagnosis, including those not in bed at all.)

Figure 17 shows the mean time in bed for all cases, including those who were not in bed as well as those who were confined to bed. It thus represents the average severity of all cases of a given operation with only one diagnosis. At the head of the list with an average of 36 days in bed are operations on the bones, joints, and other organs of locomotion. Following this comes hysterectomy with a mean of 26 days in bed; gall bladder, 24 days; tumors of the female genital organs, 21 days; and cancer, 20 days in bed. At the other end of the list are the minor operations that cause little or no time in bed, including strapping of a rib or reduction of a dislocation, 1.3 days; benign tumors, except of the female genital organs, 1.6 days; and lancing of a boil or abscess, 1.8 days in bed. The most frequent of the short duration cases are tonsillectomies with an average duration in bed of 3.0 days; since this operation constitutes nearly one-third of the total, the duration for all operations combined is short, 7.7 days in bed.

For a smaller number of diagnoses more detailed data on the duration in the hospital and in bed are shown in tables 20 and 21, respectively. These tables show mean durations for cases with only one diagnosis and for those with two or more diagnoses; the distributions according to duration are confined to cases with only one diagnosis as more nearly representing the illness associated with a given kind of operation. As might be expected, the mean durations for complicated cases are uniformly longer than for cases with only one diagnosis.¹³

¹³ The numbers of deaths are too small to give any reliable data on case fatality but they may be worth recording here. Death was occasionally the reason for a family being discontinued from the study; therefore, data for families under observation for less than 12 months are added to those for the families under observation the whole 12-month period. Among 8,390 individuals in the part-time families there were 4,236 full-time years of life with 278 operations and 5 deaths. The following table includes operations and deaths from sole, primary, and contributory causes in both full and part-time families:

| Nature of operation | Number of operations during study | Number of cases that terminated fatally during the study | Percentage fatal |
|--|-----------------------------------|--|------------------|
| All operations..... | 2,901 | 38 | 1.3 |
| Tonsillectomy and adenoidectomy..... | 949 | — | — |
| Ear and mastoid operations..... | 130 | 3 | 2.3 |
| Appendectomy..... | 225 | 4 | 1.8 |
| Miscellaneous other abdominal operations..... | 154 | 8 | 5.2 |
| Lancing of boil or abscess..... | 89 | 2 | 2.2 |
| Removal of tumors (except of the female genital organs)..... | 133 | 1 | .8 |
| Operations on the female genital organs..... | 237 | 3 | 1.3 |
| Circumcision..... | 101 | — | — |
| Operations on injuries..... | 591 | 4 | .7 |
| Miscellaneous other operations..... | 292 | 14 | 4.8 |

One of the deaths occurred in connection with a case that had both gall bladder and appendicitis operations, so the total deaths equal one less than the sum of the separate classes

TABLE 20.—Distribution according to the time in the hospital for certain surgical hospital cases in which there were no complicating diagnoses, and mean duration in hospital for complicated and uncomplicated cases—8,768 canvassed while families in 18 States during 12 consecutive months, 1928-31

| Nature of operation | Cases with only 1 diagnosis (uncomplicated) | | | | | | | | | | Cases with 2 or more diagnoses (complicated) | | | | | | | | |
|---|---|--------------------------|---|--|------|-----|-------|------|------|-------|--|--------------------------------------|---|------|------|-----|------|-------|------|
| | Number of surgical cases | Average days in hospital | | Percent of hospital cases that were in the hospital the specified number of days | | | | | | | | Number of surgical cases in hospital | Percent of all surgical cases that were in hospital | | | | | | |
| | | In hospital | Per cent of cases that were in hospital | Total hospital cases | 1 | 2-3 | 4-5 | 6-8 | 9-11 | 12-17 | 18-24 | 25-45 | 46 or more | | | | | | |
| All operations— | 2,277 | 1,317 | 57.8 | 4.7 | 8.2 | 3 | 100.0 | 36.7 | 16.5 | 6.1 | 7.9 | 13.8 | 6.1 | 2.3 | 1.7 | 279 | 80.6 | 16.5 | |
| All operations except male and female genital and puerperal | 2,040 | 1,167 | 57.2 | 4.4 | 7.7 | 2 | 100.0 | 40.0 | 17.4 | 4.9 | 7.5 | 12.5 | 5.6 | 3.0 | 1.6 | 190 | 76.5 | 17.2 | |
| Tonsillectomy and adenoidectomy | 705 | 498 | 75.2 | 1.3 | 1.7 | 1 | 100.0 | 68.0 | 25.8 | 3.4 | 1.2 | .5 | .8 | .2 | — | 37 | 74.0 | 6.1 | |
| Ear and mastoid operations | 87 | 33 | 37.9 | 3.3 | 8.8 | 7 | 100.0 | 6.1 | 12.1 | 21.2 | 18.2 | 9.1 | 15.2 | — | — | 14 | 38.9 | 14.4 | |
| Appendectomy | 154 | 152 | 98.7 | 13.3 | 13.5 | 12 | 100.0 | — | — | 7 | 13.8 | 26.3 | 43.4 | 9.2 | 6.6 | — | 48 | 100.0 | 18.1 |
| Miscellaneous other abdominal operations | 109 | 103 | 94.5 | 17.3 | 18.3 | 14 | 100.0 | — | 1.9 | 2.9 | 3.9 | 6.8 | 10.7 | 23.3 | 12.6 | 4.8 | 30 | 96.8 | 24.0 |
| Lancing of boils or abscess | 76 | 10 | 13.2 | .7 | 5.2 | 3 | 100.0 | 30.0 | 20.0 | 20.0 | 20.0 | — | — | 10.0 | — | 4 | 57.1 | 6.5 | |
| Removal of tumors (except of the female genital organs) | 114 | 21 | 18.4 | 1.1 | 6.0 | 5 | 100.0 | 23.8 | 23.8 | 9.5 | 22.8 | 4.8 | 9.5 | 4.8 | — | — | 8 | 72.7 | 10.6 |
| Operations on the female genital organs | 150 | 115 | 76.7 | 8.8 | 11.6 | 10 | 100.0 | 2.6 | 8.7 | 17.4 | 13.9 | 12.2 | 27.0 | 12.2 | 5.2 | — | 67 | 97.1 | 15.9 |
| Circumcision | 80 | 28 | 35.0 | 1.2 | 3.3 | 1 | 100.0 | 66.7 | 8.3 | 8.3 | 8.3 | 8.3 | — | — | — | — | 10 | 71.4 | 4.5 |
| Bone set | 282 | 69 | 24.5 | 5.1 | 20.7 | 7 | 100.0 | 25.8 | 12.1 | 4.6 | 15.2 | 4.5 | 7.6 | 7.6 | — | 10 | 71.4 | 33.4 | |
| Operations on injuries (except setting of bone) | 226 | 60 | 26.6 | 1.9 | 7.1 | 4 | 100.0 | 25.4 | 23.7 | 8.5 | 13.6 | 10.2 | 8.5 | 5.1 | 5.1 | — | 6 | 60.0 | 29.2 |
| Miscellaneous other operations | 204 | 128 | 62.7 | 10.0 | 16.0 | 9 | 100.0 | 12.8 | 10.4 | 10.4 | 16.0 | 12.8 | 17.6 | 10.4 | 4.0 | 4.0 | 45 | 80.4 | 15.9 |

TABLE 21.—Distribution according to time in bed for certain surgical cases in which there were no complicating diagnoses, and mean duration in bed for complicated and uncomplicated cases—8,758 canvassed while families in 18 States during 12 consecutive months, 1928-31

| Nature of operation | Cases with only 1 diagnosis (uncomplicated) | | | | | | | | | | | | Cases with 2 or more diagnoses (complicated) | | | | | | |
|--|---|-------|---|---------|--|------------|-------|-------|-------|------|------|-------|--|-------|------------|-------------|---|-------|------|
| | Number of surgical cases | | Average days in bed | | Percent of all cases that were in bed the specified number of days | | | | | | | | | | | | Total number of surgical cases that were in bed | | |
| | | | Per cent of surgical cases that were in bed | Per bed | Total cases | Not in bed | 1 | 2-3 | 4-5 | 6-8 | 9-11 | 12-17 | 18-24 | 25-45 | 46 or more | Total cases | | | |
| All operations----- | 2,277 | 1,715 | 76.3 | 7.7 | 10.3 | 4 | 100.0 | 24.7 | 8.9 | 25.0 | 9.0 | 6.7 | 6.0 | 8.0 | 5.7 | 4.1 | 1.9 | 346 | 85.7 |
| All operations except male and female genital and puerperal----- | 2,040 | 1,516 | 74.3 | 7.3 | 9.9 | 4 | 100.0 | 25.7 | 9.4 | 26.3 | 9.0 | 6.0 | 5.7 | 7.3 | 5.2 | 3.8 | 1.7 | 290 | 94.2 |
| Tonsillectomy and adenoidectomy----- | 795 | 770 | 98.9 | 3.0 | 3.1 | 2 | 100.0 | 3.1 | 10.0 | 62.7 | 16.5 | 4.9 | 2.3 | 8 | 6 | 1 | ----- | 50 | 96.0 |
| Ear and mastoid operations----- | 87 | 69 | 79.3 | 7.8 | 9.8 | 7 | 100.0 | 20.7 | 3.4 | 13.8 | 6.9 | 20.7 | 13.8 | 8.0 | 9.2 | 3.4 | 1.3 | 36 | 94.4 |
| Appendectomy----- | 154 | 100 | 100.0 | 16.3 | 14 | 100.0 | ----- | ----- | ----- | 3.9 | 26.0 | 38.3 | 19.5 | 10.4 | 1.3 | ----- | 48 | 100.0 | |
| Miscellaneous other abdominal operations----- | 109 | 106 | 97.2 | 20.3 | 20.8 | 19 | 100.0 | 2.8 | 1.8 | 4.6 | 11.0 | 22.9 | 26.6 | 22.9 | 3.7 | 3.1 | 96.8 | 38.7 | |
| Lancing of boil or abscess----- | 76 | 30 | 30.5 | 1.8 | 4.6 | 3 | 100.0 | 60.5 | 5.3 | 17.1 | 6.6 | 4.0 | 4.0 | 2.6 | ----- | 7 | 71.4 | 12.7 | |
| Removal of tumors (except of the female genital organs)----- | 114 | 28 | 29.6 | 1.6 | 6.5 | 5 | 100.0 | 75.4 | 1.8 | 9.6 | 1.8 | 6.1 | ----- | 3.5 | 1.8 | ----- | 11 | 81.8 | |
| Operations on the female genital organs----- | 150 | 135 | 90.0 | 14.7 | 16.4 | 13 | 100.0 | 10.0 | 2.0 | 9.3 | 14.7 | 11.3 | 21.3 | 16.7 | 8.0 | 4.7 | 69 | 100.0 | |
| Circumcision----- | 80 | 57 | 71.2 | 2.4 | 3.3 | 2 | 100.0 | 28.8 | 10.0 | 37.5 | 10.0 | 10.0 | 3.8 | ----- | 14 | 100.0 | 5.6 | | |
| Bone set----- | 282 | 114 | 40.4 | 10.3 | 25.4 | 10 | 100.0 | 59.6 | 2.1 | 8.2 | 3.6 | 6.0 | 2.8 | 4.3 | 4.6 | 3.9 | 6.0 | 14 | 85.7 |
| Operations on injuries (except of bone)----- | 226 | 96 | 42.5 | 4.0 | 9.3 | 4 | 100.0 | 57.5 | 7.5 | 11.5 | 5.3 | 5.8 | 2.6 | 4.0 | 2.6 | 2.2 | 0.9 | 10 | 90.0 |
| Miscellaneous other operations----- | 204 | 156 | 70.5 | 10.2 | 21.2 | 10 | 100.0 | 23.5 | 2.9 | 14.2 | 7.8 | 8.8 | 8.3 | 12.8 | 5.9 | 9.8 | 5.9 | 56 | 94.6 |

Informants tend to report the durations of the illnesses in such terms as 3, 5, and 10 days; 1, 2, and 3 weeks; or in months only. Because of this tendency to round off the duration in days or to report it only in weeks or months, the class intervals in these tables are arranged to center on these round figures. Thus 6-8 days, 12-17 days, and 18-24 days represent approximately 1, 2, and 3 weeks, respectively. In spite of these various sources of error the average duration is probably a fairly reliable figure.

The durations in the hospital (table 20) are in general rather similar to those in bed (table 21). The average days in the hospital are slightly less than in bed, because of time in bed during convalescence after leaving the hospital or in the acute stages before going to the hospital.

Some of the data in table 21 for cases with only one diagnosis may be summarized. Appendectomy represents an average of 16.3 days in bed, with nearly one-third of the cases in bed more than 18 days. The miscellaneous abdominal operations, including hernia and gall bladder, have an average duration of 20 days in bed per total case, with more than one-fourth in bed more than 25 days. Only about 40 percent of the injuries that have surgical treatment have any time in bed. While 97 percent of the cases with tonsillectomy are in bed for one or more days, the average is only 3 days, and less than 10 percent are in bed for more than 5 days.

VI. SUMMARY

Records of all surgical operations were obtained for 8,758 white families in 130 localities in 18 States for a period of 12 consecutive months between 1928 and 1931. Each family was visited at intervals of 2 to 4 months to obtain the data.

The surveyed families include representation from nearly all geographic sections, from rural, urban, and metropolitan areas, from all income classes, and of both native- and foreign-born persons. With respect to income, the distribution was reasonably similar to the estimated distribution of the general population of the United States at the time of the survey.

Considering the whole surveyed group there were 65 surgical operations per 1,000 persons per year. The rates for males and females were 62 and 68 per 1,000, respectively. The highest rates occurred at 5-9 and 30-34 years of age. The first peak is largely accounted for by tonsillectomy and the second by female genital and puerperal conditions (fig. 1).

Tonsillectomy constituted nearly one-third of all operations. The setting of a fractured bone was second in frequency, appendectomy third, and the removal of benign tumors (exclusive of female genital organs) was fourth in frequency (fig. 2).

The age curves of the various types of operations differ radically (figs. 3 and 4).

The setting of a fractured bone, other operations in connection with injuries, hernia, and sinus operations were all definitely higher among males than females. Appendectomy, gall bladder, cancer, and thyroid operations were definitely higher among females (figs. 5 and 6).

The frequency of operations increased definitely with income (figs. 8 and 9). The largest relative variations with income occurred in the removal of tumors and ear and mastoid operations (fig. 10). Operations were more frequent among professional and business men than among laborers (fig. 7).

Operations were more frequent in large cities than in rural districts (figs. 11, 12, and 15).

Sixty-one percent of all operations had some hospital service; the other 39 percent were done in the office or clinic or at home.

VII. REFERENCES

Preceding Papers in this Series

- (1) Collins, Selwyn D.: Causes of illness in 9,000 families. *Pub. Health Rep.*, **48**: 283-308 (Mar. 24, 1933). (Reprint 1563.)
- (2) ————— Frequency of health examinations in 9,000 families. *Pub. Health Rep.*, **49**: 321-346 (Mar. 9, 1934). (Reprint 1618.)
- (3) ————— Frequency of eye refractions in 9,000 families. *Pub. Health Rep.*, **49**: 649-666 (June 1, 1934). (Reprint 1627.)
- (4) ————— A general view of the causes of illness and death at specific ages. *Pub. Health Rep.*, **50**: 237-255 (Feb. 22, 1935). (Reprint 1673.)
- (5) ————— Age incidence of illness and death considered in broad disease groups. *Pub. Health Rep.*, **50**: 507-525 (Apr. 12, 1935). (Reprint 1681.)
- (6) ————— Age incidence of specific causes of illness. *Pub. Health Rep.*, **50**: 1404-1427 (Oct. 11, 1935). (Reprint 1710.)
- (7) ————— History and frequency of smallpox vaccinations and cases in 9,000 families. *Pub. Health Rep.*, **51**: 443-479 (Apr. 17, 1936). (Reprint 1740.)
- (8) ————— History and frequency of typhoid fever immunizations and cases in 9,000 families. *Pub. Health Rep.*, **51**: 897-926 (July 10, 1936). (Reprint 1758.)
- (9) ————— History and frequency of diphtheria immunizations and cases in 9,000 families. *Pub. Health Rep.*, **51**: 1736-1773 (Dec. 18, 1936). (Reprint 1789.)
- (10) ————— History and frequency of clinical scarlet fever cases and of injections for artificial immunization among 9,000 families. *Pub. Health Rep.*, **53**: 409-427 (Mar. 18, 1938). (Reprint 1917.)

Other References

- (11) ————— The health of the school child. *Pub. Health Bulletin No. 200*. Government Printing Office, Washington, D. C. (August 1931).
- (12) Falk, I. S., Klem, Margaret C., and Sinai, N.: The incidence of illness and the receipt and costs of medical care among representative families. Publication No. 26 of the Committee on the Costs of Medical Care, University of Chicago Press, 1933.
- (13) Halsted, William S.: The training of the surgeon. *Am. Med.*, **8**: 69-75 (July 9, 1904).
- (14) Maes, Urban: Aseptic surgical technique. Chapter 7 of Vol. I of *Practice of Surgery*, Edited by Dean D. Lewis and others, W. F. Prior Co., Hagerstown, Md., 1937.
- (15) Matas, Rudolph: William Stewart Halsted, an appreciation. *Bull. Johns Hopkins Hosp.*, **36**: 2-27 (January 1925).

- (16) Osler, Sir William: *The Evolution of Modern Medicine*. Yale University Press, New Haven, 1923.
- (17) Owen, Edmund: Article on surgery in *Encyclopedia Britannica*, 26: 125-132, 13th ed., New York.
- (18) Pearl, Raymond: *Medical Biometry and Statistics*, 2d Edition. W. B. Saunders Co., 1930.
- (19) Peebles, Alton: *Medical facilities in the United States*. Publication No. 3 of the Committee on the Costs of Medical Care, Washington, D. C., 1929.

MATERNAL MORTALITY RATES, BY STATES, 1926-36, AND DEATHS AND DEATH RATES FROM ALL PUEPERAL CAUSES, 1932-36

According to the number of inquiries received by the Public Health Service, the rate tables for maternal and infant mortality would stand well up in a list of vital statistics data in which professional persons, health workers, and members of the public in general are interested. A rate table for infant mortality was published in the PUBLIC HEALTH REPORTS for June 25, 1937, and it is believed that the maternal mortality rates for the registration area and for each State, just released by the Bureau of the Census, will be found both interesting and useful. In the first accompanying table these data are shown for the 11 years from 1926 to 1936, inclusive. This rate table is supplemented by data from a special report issued by the Bureau of the Census showing the deaths and death rates from the various puerperal causes upon which the aggregate maternal mortality rates are based. These data are given for the 5-year period, 1932 to 1936.

Maternal mortality rate—number of puerperal deaths¹ per 1,000 live births, 1926-36²

| Area | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|
| Birth registration States... | 6.6 | 6.5 | 6.9 | 7.0 | 6.7 | 6.6 | 6.3 | 6.2 | 5.9 | 5.8 | 5.7 |
| Alabama..... | (*) | 8.0 | 9.4 | 9.9 | 9.0 | 8.1 | 7.6 | 7.5 | 6.4 | 6.2 | 7.4 |
| Arizona..... | 10.2 | 8.9 | 7.7 | 7.8 | 6.5 | 8.2 | 8.1 | 6.5 | 5.9 | 5.8 | 9.1 |
| Arkansas..... | (*) | 9.0 | 8.8 | 9.1 | 9.4 | 7.1 | 6.6 | 7.8 | 6.4 | 6.2 | 7.6 |
| California..... | 6.6 | 5.8 | 6.1 | 5.7 | 5.1 | 6.2 | 5.6 | 4.6 | 4.3 | 4.5 | 4.7 |
| Colorado..... | (*) | 9.6 | 8.6 | 7.4 | 7.0 | 7.4 | 6.2 | 7.5 | 7.3 | 7.1 | 7.1 |
| Connecticut..... | 5.8 | 5.5 | 5.3 | 5.4 | 4.9 | 4.3 | 4.8 | 5.0 | 4.7 | 4.3 | 4.1 |
| Delaware..... | 9.3 | 5.9 | 5.6 | 6.3 | 6.5 | 7.1 | 8.2 | 6.9 | 5.8 | 6.4 | 7.1 |
| District of Columbia..... | 7.7 | 8.6 | 8.5 | 7.0 | 9.0 | 7.1 | 9.0 | 5.0 | 3.8 | 0.7 | 6.9 |
| Florida..... | 10.7 | 11.0 | 10.1 | 9.5 | 10.2 | 10.4 | 10.1 | 11.5 | 8.4 | 8.7 | 8.1 |
| Georgia..... | (*) | 10.7 | 9.7 | 9.3 | 10.6 | 9.9 | 9.2 | 7.5 | 7.6 | 7.3 | 8.2 |
| Idaho..... | 5.7 | 6.0 | 6.8 | 6.1 | 6.5 | 5.1 | 5.3 | 4.3 | 6.2 | 6.3 | 4.4 |
| Illinois..... | 6.5 | 5.6 | 5.7 | 6.8 | 5.5 | 5.5 | 5.6 | 5.0 | 5.2 | 5.0 | 4.5 |
| Indiana..... | 6.5 | 6.6 | 6.2 | 7.0 | 6.2 | 6.1 | 5.7 | 5.9 | 5.8 | 5.3 | 4.8 |
| Iowa..... | 6.0 | 5.9 | 4.8 | 5.6 | 5.9 | 5.0 | 5.4 | 5.3 | 5.1 | 5.4 | 4.6 |
| Kansas..... | 7.0 | 6.3 | 7.7 | 6.8 | 7.3 | 6.2 | 6.2 | 5.5 | 6.0 | 6.1 | 5.7 |
| Kentucky..... | 5.8 | 4.9 | 6.0 | 6.6 | 6.4 | 6.4 | 5.7 | 5.3 | 5.4 | 5.3 | 5.6 |
| Louisiana..... | (*) | 9.1 | 11.4 | 9.9 | 10.0 | 8.6 | 8.1 | 8.4 | 7.9 | 7.9 | 8.7 |
| Maine..... | 6.7 | 8.0 | 7.4 | 7.2 | 7.2 | 7.9 | 6.4 | 7.0 | 6.0 | 5.7 | 5.1 |
| Maryland..... | 5.8 | 5.8 | 6.5 | 5.5 | 5.6 | 6.1 | 5.1 | 5.0 | 5.2 | 5.4 | 4.7 |
| Massachusetts..... | 6.4 | 6.3 | 6.4 | 6.8 | 6.4 | 6.5 | 6.0 | 6.7 | 5.4 | 5.7 | 4.9 |
| Michigan..... | 6.7 | 6.8 | 6.6 | 6.6 | 6.2 | 6.0 | 6.0 | 6.1 | 5.7 | 5.8 | 5.2 |
| Minnesota..... | 5.7 | 4.4 | 5.7 | 4.3 | 5.3 | 4.9 | 4.8 | 4.4 | 4.5 | 4.7 | 4.2 |
| Mississippi..... | 7.9 | 8.7 | 9.4 | 8.9 | 9.6 | 8.0 | 6.3 | 7.3 | 6.6 | 6.7 | 6.9 |
| Missouri..... | (*) | 6.7 | 7.0 | 7.3 | 6.1 | 7.3 | 6.7 | 5.8 | 6.1 | 5.7 | 6.1 |

¹ Puerperal deaths include International List numbers 140-150.

² Vital statistics—Special Report, vol. 5, No. 16, Mar. 1, 1936, pp. 44-45. Bureau of the Census.

³ Not added to birth registration area until a later date.

Maternal mortality rate—number of puerperal deaths¹ per 1,000 live births, 1926-36
—Continued.

| Area | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|
| Montana..... | 8.0 | 6.6 | 7.5 | 8.4 | 6.9 | 7.3 | 6.6 | 5.7 | 5.7 | 5.2 | 5.5 |
| Nebraska..... | 6.6 | 5.9 | 6.0 | 6.1 | 5.8 | 5.4 | 5.2 | 4.6 | 5.2 | 5.9 | 5.0 |
| Nevada..... | (*) | (*) | (*) | 6.3 | 10.5 | 9.8 | 6.3 | 8.1 | 6.3 | 7.7 | 5.6 |
| New Hampshire..... | 7.6 | 6.5 | 6.3 | 7.5 | 6.2 | 6.8 | 5.9 | 6.9 | 5.7 | 6.1 | 4.8 |
| New Jersey..... | 5.8 | 6.3 | 5.9 | 5.5 | 5.6 | 5.7 | 5.7 | 5.4 | 5.3 | 4.6 | 4.0 |
| New Mexico..... | (*) | (*) | (*) | 8.7 | 8.6 | 7.2 | 9.1 | 8.6 | 7.4 | 6.9 | 7.4 |
| New York..... | 5.7 | 6.1 | 5.9 | 5.6 | 5.6 | 5.9 | 5.9 | 6.2 | 5.3 | 5.3 | 4.9 |
| North Carolina..... | 8.8 | 6.6 | 7.8 | 8.4 | 8.3 | 8.0 | 6.8 | 6.8 | 7.1 | 6.5 | 6.6 |
| North Dakota..... | 4.3 | 5.1 | 5.7 | 5.5 | 5.8 | 4.9 | 4.4 | 4.9 | 4.7 | 5.3 | 4.3 |
| Ohio..... | 6.7 | 6.2 | 6.4 | 6.7 | 6.3 | 6.5 | 6.3 | 6.1 | 6.0 | 6.2 | 5.0 |
| Oklahoma..... | (*) | (*) | 7.1 | 8.2 | 6.9 | 6.2 | 7.2 | 6.5 | 6.0 | 5.9 | 6.2 |
| Oregon..... | 5.9 | 6.4 | 6.1 | 5.9 | 5.8 | 4.5 | 4.7 | 5.5 | 6.1 | 5.4 | 5.4 |
| Pennsylvania..... | 6.4 | 6.4 | 6.1 | 6.5 | 6.0 | 6.5 | 6.1 | 5.8 | 5.8 | 5.5 | 5.2 |
| Rhode Island..... | 6.0 | 6.4 | 6.0 | 7.9 | 5.7 | 5.5 | 6.0 | 5.7 | 5.5 | 4.4 | 4.0 |
| South Carolina..... | (*) | (*) | 10.9 | 11.4 | 11.4 | 10.2 | 9.4 | 8.0 | 8.7 | 9.5 | 9.0 |
| South Dakota..... | (*) | (*) | (*) | (*) | (*) | (*) | 3.7 | 4.8 | 5.1 | 6.5 | 4.6 |
| Tennessee..... | (*) | 7.1 | 8.9 | 8.7 | 8.4 | 7.4 | 7.2 | 6.0 | 6.2 | 6.7 | 7.0 |
| Texas..... | (*) | (*) | (*) | (*) | (*) | (*) | 7.7 | 7.3 | 7.3 | 6.9 | 6.9 |
| Utah..... | 4.9 | 7.5 | 4.9 | 4.9 | 4.9 | 4.2 | 4.3 | 4.5 | 4.5 | 4.6 | 4.4 |
| Vermont..... | 6.7 | 7.3 | 5.8 | 7.7 | 6.6 | 7.6 | 7.1 | 5.7 | 3.9 | 6.8 | 5.0 |
| Virginia..... | 8.0 | 6.2 | 7.5 | 7.1 | 7.1 | 7.5 | 7.1 | 6.3 | 6.4 | 5.6 | 5.8 |
| Washington..... | 7.5 | 6.6 | 7.2 | 6.2 | 6.2 | 6.4 | 6.0 | 6.4 | 4.9 | 4.9 | 5.2 |
| West Virginia..... | 7.1 | 6.2 | 5.7 | 5.8 | 6.0 | 5.8 | 5.7 | 5.7 | 5.5 | 5.2 | 5.3 |
| Wisconsin..... | 6.0 | 5.3 | 5.8 | 5.1 | 5.4 | 4.5 | 4.4 | 5.0 | 4.3 | 4.0 | 4.2 |
| Wyoming..... | 9.3 | 8.7 | 6.5 | 6.3 | 9.2 | 8.4 | 6.6 | 5.7 | 6.1 | 4.1 | 5.0 |

¹ Not added to birth registration area until a later date.

⁴ Dropped from the registration area in 1925; readmitted in 1928.

Number of deaths from all puerperal causes and death rates (number per 1,000 live births) in the birth registration area in the United States, 1932-36¹

| Cause of death | Number of deaths | | | | | Rate per 1,000 live births | | | | |
|---|------------------|--------|--------|--------|--------|----------------------------|------|------|------|------|
| | 1936 | 1935 | 1934 | 1933 | 1932 | 1936 | 1935 | 1934 | 1933 | 1932 |
| The puerperal state..... | 12,183 | 12,544 | 12,859 | 12,885 | 13,120 | 5.68 | 5.82 | 5.93 | 6.19 | 6.32 |
| Abortion with septic conditions..... | 1,801 | 2,167 | 2,204 | 2,037 | 2,026 | .83 | 1.00 | 1.01 | .97 | .97 |
| Abortion without mention of septic condition (to include hemorrhage)..... | 681 | 602 | 570 | 640 | 706 | .31 | .27 | .26 | .30 | .34 |
| Ectopic gestation..... | 486 | 545 | 571 | 610 | 562 | .22 | .25 | .26 | .29 | .27 |
| With septic condition specified. | 100 | 105 | 106 | 121 | 103 | .04 | .04 | .04 | .05 | .04 |
| Without mention of septic condition..... | 386 | 440 | 465 | 480 | 459 | .17 | .20 | .21 | .23 | .22 |
| Other accidents of pregnancy (not to include hemorrhage)..... | 80 | 84 | 94 | 88 | 84 | .03 | .03 | .04 | .04 | .04 |
| Puerperal hemorrhage..... | 1,398 | 1,370 | 1,404 | 1,339 | 1,377 | .65 | .63 | .64 | .64 | .66 |
| Puerperal septicemia (not specified as due to abortion)..... | 2,705 | 2,902 | 2,808 | 2,729 | 2,734 | 1.26 | 1.34 | 1.29 | 1.31 | 1.31 |
| Puerperal septicemia and pyemia..... | 2,697 | 2,897 | 2,800 | 2,719 | 2,721 | 1.25 | 1.34 | 1.29 | 1.30 | 1.31 |
| Puerperal tetanus..... | 8 | 5 | 8 | 10 | 13 | (*) | (*) | (*) | (*) | (*) |
| Puerperal albuminuria and eclampsia..... | 2,235 | 2,229 | 2,431 | 2,520 | 2,650 | 1.04 | 1.03 | 1.12 | 1.21 | 1.28 |
| Other toxemias of pregnancy..... | 549 | 497 | 559 | 535 | 489 | .25 | .23 | .25 | .25 | .23 |
| Puerperal phlegmasia, alba dolens, embolus, sudden death (not specified as septic)..... | 567 | 578 | 561 | 592 | 626 | .26 | .26 | .25 | .28 | .30 |
| Other accidents of childbirth..... | 1,635 | 1,543 | 1,621 | 1,750 | 1,807 | .76 | .71 | .74 | .84 | .87 |
| Cesarean operation..... | 409 | 336 | 416 | 389 | 440 | .19 | .15 | .19 | .18 | .21 |
| Others under this title..... | 1,226 | 1,207 | 1,205 | 1,361 | 1,367 | .37 | .56 | .55 | .65 | .65 |
| Other and unspecified conditions of the puerperal state..... | 46 | 27 | 36 | 45 | 50 | .02 | .01 | .01 | .02 | .02 |

¹ Vital Statistics—Special Report, vol. 5, No. 19, p. 53, Mar. 29, 1938, Bureau of the Census.

² Less than 0.01 per 1,000 live births.

PUBLIC HEALTH SERVICE PUBLICATIONS**A List of Publications Issued During the Period July-December 1937**

There is printed herewith a list of publications of the United States Public Health Service issued during the period July-December 1937.

The most important articles that appear each week in the PUBLIC HEALTH REPORTS are reprinted in pamphlet form, making possible a wider and more economical distribution of information that is of especial value and interest to public health workers and the general public.

All of the publications listed below except those marked with an asterisk (*) are available for free distribution and as long as the supply lasts may be obtained by addressing the Surgeon General, United States Public Health Service, Washington, D. C. Those publications marked with an asterisk are not available for free distribution, but, unless stated to be "out of print," may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., *at the prices noted*. (No remittances should be sent to the Public Health Service.)

Periodicals

*Public Health Reports (weekly), July-December, vol. 52, nos. 27-53, pages 872 to 1965. 5 cents a copy.

*Venereal Disease Information (monthly), July-December, vol. 18, nos. 7-12, pages 223 to 458. 5 cents a copy.

Reprints From the Public Health Reports

1836. Studies on trichinosis. IV. The role of the garbage-fed hog in the production of human trichinosis. By Maurice C. Hall. July 2, 1937. 14 pages.
1837. A low temperature ball mill for the liberation of labile cellular products. By Stuart Mudd, C. H. Shaw, E. J. Czarnetzky, and Earl W. Flosdorff. July 2, 1937. 6 pages.
1838. Spontaneous mammary tumors in mice. Factors influencing the incidence of metastases. By L. L. Ashburn. July 9, 1937. 14 pages.
1839. Experimental studies of natural purification in polluted waters. X. Re-oxygenation of polluted waters by microscopic algae. By W. C. Purdy. July 16, 1937. 34 pages.
1840. Some factors which affect the relationship between housing and health. By J. M. DallaValle. July 23, 1937. 10 pages.
1841. Age of gainful white and negro male workers of the United States 1920 and 1930. Studies on the age of gainful workers no. 4. By William M. Gafafer. July 23, 1937. 13 pages.
1842. A study of syphilis in the Coast Guard. By H. McG. Robertson. July 30, 1937. 8 pages.
1843. Recent court decisions on milk control (1934-1937). By James A. Tobey. July 30, 1937. 7 pages.
1844. Studies on chronic brucellosis. I. Introduction. By Alice C. Evans. August 6, 1937. 5 pages.

1845. Case records as an index of the public health nurse's work. By Helen Bean and Emily Hankla. August 6, 1937. 12 pages.
1846. Report on market-milk supplies of certain urban communities. Compliance of the market-milk supplies of certain urban communities with the Grade A pasteurized and Grade A raw milk requirements of the Public Health Service milk ordinance and code (as shown by compliance (not safety) ratings of 90 percent or more reported by the State milk-sanitation authorities during the period July 1, 1935, to June 30, 1937). August 6, 1937. 5 pages.
1847. The occurrence in the sera of man and monkeys of protective antibodies against the virus of lymphocytic choriomeningitis as determined by the serum-virus protection test in mice. By Jerald G. Wooley, Charles Armstrong, and Robert H. Onstott. August 13, 1937. 10 pages.
1848. Note on comparative tests made with the Hatch and the Greenburg-Smith impingers. By J. M. DallaValle. August 13, 1937. 4 pages.
1849. Public Health Service publications. A list of publications issued during the period January-June 1937. August 13, 1937. 5 pages.
1850. Experimental meningitis in guinea pigs. By S. E. Branham, R. D. Lillie, and A. M. Pabst. August 20, 1937. 9 pages; 2 plates.
1851. Serum studies in experimental meningitis. Lack of protection for rabbits and guinea pigs. By Sara E. Branham and Anna M. Pabst. August 20, 1937. 8 pages.
1852. The elimination of selenium and its distribution in the tissues. By M. I. Smith, B. B. Westfall, and E. F. Stohlman. August 27, 1937. 6 pages.
1853. Notes on the continuous rearing of *Aedes aegypti* in the laboratory. By H. A. Johnson. August 27, 1937. 3 pages.
1854. Studies in chemotherapy. VI. The chemotherapy of choriomeningitis virus infection in mice with sulphonamide compounds. By Sanford M. Rosenthal, Jerald G. Wooley, and Hugo Bauer. September 3, 1937. 7 pages.
1855. Toxicology of selenium. IV. Effects of exposure to hydrogen selenide. By H. C. Dudley and John W. Miller. September 3, 1937. 14 pages.
1856. Biological products. Establishments licensed for the propagation and sale of viruses, serums, toxins, and analogous products. September 3, 1937. 6 pages.
1857. Further studies on the minimal threshold of chronic endemic dental fluorosis. By H. Trendley Dean and Elias Elvove. September 10, 1937. 16 pages.
1858. Relationship of a rural health program to the needs in the area. By Joseph W. Mountin, Elliott H. Pennell, and Hazel O'Hara. September 10, 1937. 21 pages.
1859. Disabling illness among industrial employees in 1936 as compared with earlier years. By Dean K. Brundage. September 17, 1937. 7 pages.
1860. Removal of fluoride from water. By Elias Elvove. September 17, 1937. 7 pages.
1861. Note on a new ocular micrometer for use in dust counting. By Richard T. Page. September 17, 1937. 2 pages.
1862. Cultivation of the rickettsiae of Rocky Mountain spotted fever in vitro. By Ida A. Bengtson. September 24, 1937. 7 pages; 4 plates.
1863. Cultivation of the rickettsiae of endemic (murine) and epidemic (European) typhus fever in vitro. By Ida A. Bengtson. September 24, 1937. 6 pages; 4 plates.
1864. Further field studies on the selenium problem in relation to public health. By M. I. Smith and B. B. Westfall. October 1, 1937. 10 pages.

1865. How expenditures for selected public health services are apportioned. By Joseph W. Mountin. October 1, 1937. 6 pages.
1866. The use of a dark adaptation technique (biophotometer) in the measurement of vitamin A deficiency in children. By Carroll E. Palmer and Harold Blumberg. October 8, 1937. 16 pages.
1867. Studies on chronic brucellosis. II. Description of techniques for specific tests. By Alice C. Evans. October 8, 1937. 9 pages; 1 plate.
1868. Dermatitis among a group of office workers found not to be of occupational origin. By Louis Schwartz and Marion B. Sulzberger. October 15, 1937. 7 pages; 1 plate.
1869. Studies on the infection of dogs with trophozoites of *Endamoeba histolytica* by the oral route. A preliminary report. By John Clyde Swartzwelder. October 15, 1937. 5 pages.
1870. Progress in oyster conditioning. With report of experiments at the demonstration plant, Norfolk, Va. By Richard Messer and George M. Reece. October 15, 1937. 9 pages.
1871. Studies on oxyuriasis. VI. The incidence of oxyuriasis in 1,272 persons in Washington, D. C., with notes on diagnosis. By Eloise B. Cram, Myrna F. Jones, Lucy Reardon, and Mabelle O. Nolan. October 22, 1937. 25 pages.
1872. The association of scurvy with oral diseases. By F. C. Cady. October 29, 1937. 5 pages.
1873. Kentucky's plan for public health education. By A. T. McCormack and Reba F. Harris. October 29, 1937. 5 pages.
1874. General aspects and functions of the sick benefit organization. By R. R. Sayers, Gertrud Kroeger, and W. M. Gafafer. November 5, 1937. 18 pages.
1875. Treatment of psoriasis with massive doses of crystalline vitamin D and irradiated ergosterol. A preliminary report. By E. T. Ceder and Leo Zon. November 5, 1937. 4 pages.
1876. Pulmonary tumors in mice. IV. Lung tumors induced by subcutaneous injection of 1:2:5:6-dibenzanthracene in different media and by its direct contact with lung tissues. By H. B. Andervont. November 5, 1937. 6 pages; 3 plates.
1877. State and insular health authorities, 1937. Directory, with data as to appropriations and publications. November 12, 1937. 20 pages.
1878. Protracted incubation in malarial fever. Report of a case and a review of the literature. By Bruce Mayne. November 12, 1937. 9 pages.
1879. Extent of rural health service in the United States, December 31, 1932, to December 31, 1936. November 19, 1937. 28 pages.
1880. Directory of whole-time county health officers, 1937. November 19, 1937. 14 pages.
1881. Immunizing properties of formalized Rocky Mountain spotted fever rickettsiae cultivated in modified Maitland media. By Ida A. Bengtson. November 26, 1937. 6 pages.
1882. Methods for the determination of quartz in industrial dusts. By F. H. Goldman. November 26, 1937. 11 pages.
1883. A study of dust control methods in an asbestos fabricating plant. By Richard T. Page and J. J. Bloomfield. November 26, 1937. 15 pages; 3 plates.
1884. The increase in average length of life. By Harold F. Dorn. December 3, 1937. 25 pages.
1885. An approach to a rural mental health problem. By J. Allen Jackson. December 3, 1937. 6 pages.

1886. Health supervision by nurses in a bicoount health department. Brunswick-Greenville health administration studies no. 9. By Rosalie I. Peterson. December 3, 1937. 11 pages.
1887. Seasonal variation in intensity of brain reaction of the St. Louis encephalitis in mice and of endemic typhus in guinea pigs. By R. D. Lillie, R. E. Dyer, C. Armstrong, and J. G. Pasternack. December 10, 1937. 18 pages.
1888. City health officers, 1937. Directory of those in cities of 10,000 or more population. December 10, 1937. 18 pages.
1889. Medical activities at the Boy Scout Jamboree held in Washington, D. C., June 30-July 9, 1937. By W. L. Smith. December 17, 1937. 11 pages; 3 plates.
1890. Effect of addition of dithioethylamine (cystine amine) to the diet of the albino rat. By W. H. Sebrell, R. H. Onstott, D. J. Hunt, and R. D. Lillie. December 24, 1937. 8 pages; 7 plates.
1891. The use of pure strain animals in studies on natural resistance to transplantable tumors. By H. B. Andervont. December 24, 1937. 11 pages.
1892. Mortality from rheumatic heart disease in Philadelphia during 1936. By O. F. Hedley. December 31, 1937. 17 pages.
1893. The family as a unit for nursing service. By Helen Bean and Georgie S. Brockett. December 31, 1937. 8 pages.
1894. Dibenzanthracene tumors in mice. The production of subcutaneous and pulmonary tumors by 1:2:5:6-dibenzanthracene adsorbed on charcoal. By H. B. Andervont and Egon Lorenz. December 31, 1937. 9 pages.

Supplements to the Public Health Reports

127. Suggestibility in delinquent and nondelinquent adult white males. By Victor H. Vogel. 1937. 10 pages; 1 plate.
128. Clinical studies of drug addiction. III. A critical review of the withdrawal treatments with method of evaluating abstinence syndromes. By Lawrence Kolb and C. K. Himmelsbach. 1938. 33 pages.
129. The bedbug. Its relation to public health, its habits and life history, and methods of control. By Maurice C. Hall. 1937. 7 pages.
130. Some Public Health Service publications suitable for general distribution. 1937. 22 pages.
131. The rat and ratproof construction of buildings. With specifications, drawings, and photographs and a model ratproofing ordinance. By B. E. Holsendorf. Drawings by P. W. Clark. 1937. 68 pages; 31 plates.
132. Clinical studies of drug addiction. IV. Suggestibility in narcotic addicts. By Victor H. Vogel. 1937. 7 pages.
133. Public health nursing. Prepared by Pearl McIver. 1937. 14 pages.

Public Health Bulletins

237. Illness and medical care in Puerto Rico. By Joseph W. Mountin, Elliott H. Pennell, and Evelyn Flook. June 1937. 63 pages; 16 plates.
238. Occupational and environmental analysis of the cement, clay, and pottery industries. By R. R. Sayers, J. M. DallaValle, and S. G. Bloomfield. September 1937. 50 pages.
239. Dental caries in American Indian children. By Henry Klein and Carroll E. Palmer. December 1937. 54 pages.

National Institute of Health Bulletin

169. Standardization of antipneumococcus horse sera and concentrates. By Lloyd D. Felton and H. J. Stahl. February 1937. 58 pages.

Unnumbered Publications

- Index to Public Health Reports, vol. 52, part 1 (January-June 1937). 1937. 26 pages.

Venereal Disease Bulletins

59. The wonderful story of life. A parent's talks with children regarding life and its reproduction. (Revised edition, 1937.) 19 pages.
 91. Syphilis: Its cause, its spread, its cure. 8 pages.
 92. Gonorrhea: Its cause, its spread, its cure. 7 pages.

Reprints From Venereal Disease Information

70. Control of syphilis. By Thomas Parran. Vol. 18, July 1937. 7 pages.
 71. A tentative death curve for acquired syphilis in white and colored males in the United States. By Lida J. Usilton and John Rice Miner. Vol. 18, July 1937. 9 pages.
 72. Serodiagnostic tests for syphilis in 39 State laboratories. By Thomas Parran, H. H. Hazen, J. F. Mahoney, Arthur H. Sanford, F. E. Senear, Walter M. Simpson, and R. A. Vonderlehr. Vol. 18, August 1937. 7 pages.
 73. Teaching of venereal disease control in medical schools. By Paul A. O'Leary. Vol. 18, September 1937. 5 pages.
 74. The principles of case finding. By Julia MacPhillips. Vol. 18, September 1937. 4 pages.
 75. A traveling clinic. Vol. 18, October 1937. 1 page; 2 plates.
 76. Citizen support in syphilis control. By Homer Folks. Vol. 18, October 1937. 6 pages.
 77. Creating and maintaining the interest of social workers in a program for the control of gonorrhea and syphilis. By Gladys L. Crain. Vol. 18, November 1937. 9 pages.

Supplements to Venereal Disease Information

4. Hospitals and Dispensaries for the Treatment of Venereal Diseases. 29 pages.

DEATHS DURING WEEK ENDED APR. 2, 1938

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

| | Week ended Apr. 2, 1938 | Corresponding week, 1937 |
|---|----------------------------|-----------------------------|
| Data from 86 large cities of the United States: | | |
| Total deaths..... | 8,456 | 9,381 |
| Average for 3 prior years..... | 9,369 | |
| Total deaths, first 13 weeks of year..... | 115,810 | 132,771 |
| Deaths under 1 year of age..... | 565 | 591 |
| Average for 3 prior years..... | 616 | |
| Deaths under 1 year of age, first 13 weeks of year..... | 7,072 | 8,176 |
| Data from industrial insurance companies: | | |
| Policies in force..... | 69,691,451 | 69,614,527 |
| Number of death claims..... | 13,370 | 15,923 |
| Death claims per 1,000 policies in force, annual rate..... | 10.0 | 11.9 |
| Death claims per 1,000 policies, first 13 weeks of year, annual rate..... | 10.1 | 11.5 |

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers.

In these and the following tables a zero (0) is to be interpreted to mean that no cases or deaths occurred, while leaders (-----) indicate that cases or deaths may have occurred although none were reported.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Apr. 9, 1938, and Apr. 10, 1937

| Division and State | Diphtheria | | Influenza | | Measles | | Meningococcus meningitis | |
|-----------------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|
| | Week ended Apr. 9, 1938 | Week ended Apr. 10, 1937 | Week ended Apr. 9, 1938 | Week ended Apr. 10, 1937 | Week ended Apr. 9, 1938 | Week ended Apr. 10, 1937 | Week ended Apr. 9, 1938 | Week ended Apr. 10, 1937 |
| New England States: | | | | | | | | |
| Maine..... | 3 | 1 | 6 | 3 | 276 | 4 | 0 | 1 |
| New Hampshire..... | 0 | 0 | ----- | ----- | 29 | 113 | 0 | 0 |
| Vermont..... | 0 | 0 | ----- | ----- | 94 | ----- | 0 | 0 |
| Massachusetts..... | 1 | 3 | ----- | ----- | 283 | 736 | 0 | 8 |
| Rhode Island..... | 0 | 0 | ----- | ----- | 1 | 232 | 0 | 1 |
| Connecticut..... | 5 | 4 | 5 | 12 | 28 | 799 | 3 | 2 |
| Middle Atlantic States: | | | | | | | | |
| New York..... | 33 | 31 | 13 | 126 | 3,059 | 1,020 | 3 | 10 |
| New Jersey..... | 17 | 7 | 13 | 13 | 1,577 | 3,300 | 0 | 5 |
| Pennsylvania..... | 40 | 37 | ----- | ----- | 6,032 | 661 | 5 | 13 |
| East North Central States: | | | | | | | | |
| Ohio..... | 14 | 13 | ----- | 21 | 2,553 | 270 | 4 | 2 |
| Indiana..... | 21 | 4 | 5 | 110 | 1,181 | 137 | 2 | 5 |
| Illinois..... | 22 | 46 | 10 | 105 | 3,781 | 85 | 2 | 1 |
| Michigan ¹ | 10 | 18 | 2 | ----- | 4,336 | 97 | 0 | 2 |
| Wisconsin..... | 0 | 4 | 22 | 49 | 2,958 | 19 | 1 | 2 |
| West North Central States: | | | | | | | | |
| Minnesota..... | 4 | 14 | 2 | 1 | 227 | 22 | 0 | 1 |
| Iowa..... | 2 | 1 | 8 | ----- | 194 | 8 | 1 | 0 |
| Missouri..... | 23 | 41 | 21 | 111 | 663 | 55 | 1 | 1 |
| North Dakota..... | 0 | 1 | 39 | 24 | 76 | 1 | 1 | 0 |
| South Dakota..... | 0 | 0 | ----- | ----- | 2 | ----- | 0 | 0 |
| Nebraska..... | 1 | 1 | 27 | ----- | 127 | 12 | 0 | 1 |
| Kansas..... | 6 | 5 | 6 | 4 | 513 | 26 | 1 | 4 |
| South Atlantic States: | | | | | | | | |
| Delaware..... | 0 | 3 | ----- | 5 | 25 | 39 | 0 | 2 |
| Maryland ² | 8 | 15 | 16 | 12 | 115 | 872 | 0 | 5 |
| District of Columbia..... | 3 | 4 | 1 | 1 | 17 | 116 | 0 | 2 |
| Virginia..... | 9 | 13 | ----- | ----- | 438 | 248 | 2 | 9 |
| West Virginia..... | 10 | 5 | 58 | 110 | 600 | 19 | 3 | 7 |
| North Carolina ³ | 13 | 17 | 3 | 61 | 2,390 | 204 | 1 | 4 |
| South Carolina..... | 3 | 2 | 170 | 528 | 241 | 39 | 0 | 0 |
| Georgia ⁴ | 4 | 9 | ----- | 344 | 406 | ----- | 0 | 2 |
| Florida ⁵ | 15 | 7 | 2 | 24 | 603 | 17 | 4 | 1 |

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Apr. 9, 1938, and Apr. 10, 1937—Continued

| Division and State | Diphtheria | | Influenza | | Measles | | Meningococcus meningitis | |
|-----------------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|
| | Week ended Apr. 9, 1938 | Week ended Apr. 10, 1937 | Week ended Apr. 9, 1938 | Week ended Apr. 10, 1937 | Week ended Apr. 9, 1938 | Week ended Apr. 10, 1937 | Week ended Apr. 9, 1938 | Week ended Apr. 10, 1937 |
| East South Central States: | | | | | | | | |
| Kentucky | 14 | 11 | 5 | 21 | 674 | 448 | 6 | 12 |
| Tennessee | 5 | 7 | 55 | 141 | 417 | 53 | 5 | 7 |
| Alabama ¹ | 5 | 10 | 45 | 648 | 961 | 9 | 7 | 10 |
| Mississippi ¹ | 8 | 4 | | | | | 0 | 1 |
| West South Central States: | | | | | | | | |
| Arkansas | 8 | 1 | 55 | 82 | 493 | 1 | 1 | 0 |
| Louisiana ³ | 5 | 7 | 9 | 54 | 7 | 6 | 2 | 1 |
| Oklahoma ⁴ | 8 | 16 | 74 | 115 | 112 | 55 | 1 | 2 |
| Texas ³ | 22 | 43 | 360 | 792 | 436 | 668 | 3 | 2 |
| Mountain States: | | | | | | | | |
| Montana | 0 | 0 | | 11 | 20 | 39 | 0 | 1 |
| Idaho ³ | 1 | 1 | 2 | 10 | 10 | 15 | 1 | 1 |
| Wyoming ³ | 0 | 1 | | | 46 | 3 | 0 | 0 |
| Colorado | 2 | 5 | | | 166 | 11 | 0 | 1 |
| New Mexico | 0 | 0 | 1 | 4 | 96 | 81 | 0 | 0 |
| Arizona | 2 | 0 | 92 | 38 | 32 | 238 | 1 | 8 |
| Utah ³ | 6 | 2 | | | 360 | 33 | 0 | 0 |
| Pacific States: | | | | | | | | |
| Washington | 5 | 2 | 1 | | 9 | 46 | 1 | 1 |
| Oregon ⁴ | 7 | 0 | 42 | 34 | 33 | 4 | 1 | 1 |
| California | 30 | 28 | 50 | 417 | 616 | 138 | 2 | 5 |
| Total | 395 | 444 | 1,220 | 3,931 | 37,319 | 11,001 | 65 | 139 |
| First 14 weeks of year | 8,149 | 7,218 | 36,040 | 259,592 | 451,906 | 92,723 | 1,226 | 2,347 |

| Division and State | Poliomyelitis | | Scarlet fever | | Smallpox | | Typhoid and paratyphoid fever | | Whooping cough |
|-----------------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------------|--------------------------|-------------------------|
| | Week ended Apr. 9, 1938 | Week ended Apr. 10, 1937 | Week ended Apr. 9, 1938 | Week ended Apr. 10, 1937 | Week ended Apr. 9, 1938 | Week ended Apr. 10, 1937 | Week ended Apr. 9, 1938 | Week ended Apr. 10, 1937 | Week ended Apr. 9, 1938 |
| New England States: | | | | | | | | | |
| Maine | 0 | 0 | 22 | 15 | 0 | 0 | 3 | 2 | 69 |
| New Hampshire | 0 | 0 | 24 | 13 | 0 | 0 | 0 | 0 | 1 |
| Vermont | 0 | 0 | 18 | 2 | 0 | 0 | 0 | 0 | 30 |
| Massachusetts | 0 | 0 | 405 | 274 | 0 | 0 | 0 | 1 | 105 |
| Rhode Island | 0 | 0 | 29 | 76 | 0 | 0 | 0 | 2 | 22 |
| Connecticut | 0 | 0 | 139 | 162 | 0 | 0 | 1 | 0 | 64 |
| Middle Atlantic States: | | | | | | | | | |
| New York | 4 | 2 | 1,036 | 898 | 0 | 0 | 5 | 5 | 458 |
| New Jersey | 0 | 0 | 163 | 174 | 0 | 0 | 5 | 1 | 158 |
| Pennsylvania | 0 | 0 | 602 | 598 | 0 | 0 | 11 | 7 | 296 |
| East North Central States: | | | | | | | | | |
| Ohio | 0 | 0 | 273 | 245 | 3 | 3 | 4 | 4 | 75 |
| Indiana | 0 | 0 | 124 | 234 | 74 | 9 | 6 | 0 | 12 |
| Illinois | 0 | 0 | 527 | 763 | 47 | 23 | 4 | 2 | 91 |
| Michigan ¹ | 0 | 2 | 465 | 712 | 9 | 17 | 4 | 0 | 257 |
| Wisconsin | 0 | 0 | 139 | 331 | 2 | 4 | 0 | 0 | 131 |
| West North Central States: | | | | | | | | | |
| Minnesota | 0 | 0 | 144 | 166 | 15 | 5 | 3 | 0 | 15 |
| Iowa | 0 | 0 | 246 | 295 | 50 | 53 | 1 | 0 | 20 |
| Missouri | 1 | 0 | 227 | 519 | 33 | 73 | 5 | 0 | 97 |
| North Dakota | 0 | 0 | 17 | 30 | 3 | 15 | 0 | 0 | 4 |
| South Dakota | 0 | 0 | 9 | 97 | 16 | 6 | 0 | 0 | 19 |
| Nebraska | 0 | 0 | 19 | 88 | 6 | 5 | 0 | 0 | 13 |
| Kansas | 0 | 0 | 142 | 355 | 18 | 20 | 1 | 1 | 92 |
| South Atlantic States: | | | | | | | | | |
| Delaware | 0 | 0 | 9 | 3 | 0 | 0 | 1 | 2 | 9 |
| Maryland ³ | 0 | 0 | 62 | 43 | 0 | 0 | 5 | 0 | 59 |
| District of Columbia | 0 | 0 | 23 | 11 | 0 | 0 | 1 | 1 | 13 |
| Virginia | 0 | 0 | 33 | 14 | 0 | 2 | 2 | 10 | 43 |

See footnotes at end of table.

April 22, 1938

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Apr. 9, 1938, and Apr. 10, 1937—Continued

| Division and State | Poliomyelitis | | Scarlet fever | | Smallpox | | Typhoid and paratyphoid fever | | Whooping cough |
|-----------------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------------|--------------------------|----------------|
| | Week ended Apr. 9, 1938 | Week ended Apr. 10, 1937 | Week ended Apr. 9, 1938 | Week ended Apr. 10, 1937 | Week ended Apr. 9, 1938 | Week ended Apr. 10, 1937 | Week ended Apr. 9, 1938 | Week ended Apr. 10, 1937 | |
| South Atlantic States—Con. | | | | | | | | | |
| West Virginia | 0 | 1 | 49 | 56 | 0 | 0 | 1 | 3 | 63 |
| North Carolina ¹ | 0 | 1 | 27 | 45 | 0 | 0 | 1 | 2 | 298 |
| South Carolina | 0 | 2 | 6 | 6 | 0 | 0 | 0 | 1 | 51 |
| Georgia ² | 1 | 0 | 3 | 12 | 0 | 0 | 3 | 0 | 25 |
| Florida ² | 0 | 0 | 8 | 18 | 0 | 0 | 3 | 2 | 25 |
| East South Central States: | | | | | | | | | |
| Kentucky | 2 | 0 | 69 | 58 | 8 | 2 | 0 | 11 | 28 |
| Tennessee | 0 | 0 | 30 | 35 | 2 | 0 | 3 | 6 | 42 |
| Alabama ³ | 0 | 1 | 9 | 15 | 1 | 0 | 4 | 3 | 65 |
| Mississippi ¹ | 1 | 1 | 2 | 7 | 1 | 0 | 2 | 0 | ----- |
| West South Central States: | | | | | | | | | |
| Arkansas | 0 | 0 | 4 | 12 | 9 | 2 | 4 | 3 | 69 |
| Louisiana ⁴ | 1 | 0 | 9 | 14 | 1 | 1 | 9 | 11 | 19 |
| Oklahoma ⁴ | 1 | 0 | 13 | 33 | 13 | 3 | 3 | 1 | 182 |
| Texas ² | 2 | 0 | 116 | 110 | 39 | 1 | 25 | 16 | 263 |
| Mountain States: | | | | | | | | | |
| Montana | 0 | 0 | 16 | 17 | 8 | 36 | 1 | 3 | 53 |
| Idaho ¹ | 0 | 0 | 10 | 20 | 4 | 1 | 0 | 0 | 11 |
| Wyoming ¹ | 0 | 0 | 17 | 17 | 5 | 8 | 0 | 0 | 25 |
| Colorado | 0 | 0 | 38 | 34 | 1 | 5 | 3 | 0 | 12 |
| New Mexico | 0 | 1 | 15 | 19 | 0 | 0 | 0 | 4 | 19 |
| Arizona | 0 | 0 | 8 | 23 | 1 | 0 | 0 | 1 | 61 |
| Utah ¹ | 0 | 1 | 47 | 18 | 2 | 0 | 0 | 0 | 39 |
| Pacific States: | | | | | | | | | |
| Washington | 0 | 1 | 37 | 36 | 36 | 21 | 0 | 0 | 113 |
| Oregon ⁴ | 0 | 0 | 65 | 53 | 20 | 17 | 1 | 1 | 25 |
| California | 1 | 4 | 208 | 196 | 48 | 19 | 7 | 2 | 515 |
| Total | 14 | 17 | 5,703 | 6,092 | 475 | 351 | 128 | 108 | 4,155 |
| First 14 weeks of year | 293 | 294 | 85,084 | 95,274 | 7,639 | 4,333 | 1,694 | 1,514 | 58,168 |

¹ New York City only.² Period ended earlier than Saturday.³ Typhus fever, week ended Apr. 9, 1938, 20 cases, as follows: North Carolina, 1; Georgia, 5; Florida, 4; Alabama, 4; Louisiana, 1; Texas, 5.⁴ Figures for 1937 are exclusive of Oklahoma City and Tulsa.⁵ Rocky Mountain spotted fever, week ended Apr. 9, 1938, 3 cases as follows: Idaho, 1; Wyoming, 1; Oregon, 1.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

| State | Menin-gococcus menin-gitis | Diph-theria | Influenza | Malaria | Measles | Pel-lagra | Polio-myelitis | Scarlet fever | Small-pox | Ty-phoid fever |
|----------------------|----------------------------|-------------|-----------|---------|---------|-----------|----------------|---------------|-----------|----------------|
| <i>February 1938</i> | | | | | | | | | | |
| Alaska | 6 | ----- | 29 | ----- | 1 | ----- | 0 | 4 | ----- | 0 |
| <i>March 1938</i> | | | | | | | | | | |
| Connecticut | 1 | 29 | 27 | ----- | 110 | ----- | 0 | 520 | 0 | 1 |
| Delaware | 0 | 6 | ----- | ----- | 125 | ----- | 0 | 193 | 0 | 1 |
| District of Columbia | 2 | 47 | 8 | 78 | 33 | 53 | 0 | 102 | 0 | 0 |
| North Carolina | 9 | 99 | 160 | 33 | 13,938 | 22 | 6 | 179 | 5 | 7 |
| West Virginia | 14 | 38 | 160 | ----- | 2,188 | 132 | 0 | 258 | 0 | 10 |
| Wyoming | 2 | 3 | ----- | ----- | 132 | ----- | 0 | 99 | 3 | 1 |

Summary of monthly reports from States—Continued

| <i>February 1938</i> | | <i>March, 1938—Continued</i> | | <i>March, 1938—Continued</i> | |
|-----------------------------|-------|------------------------------|-------|------------------------------|-------|
| | Cases | | Cases | | Cases |
| Alaska: | | German measles: | | Rabies in animals: | |
| Chickenpox..... | 27 | Connecticut..... | 27 | Connecticut..... | 2 |
| Impetigo contagiosa..... | 2 | Delaware..... | 1 | Septic sore throat: | |
| Mumps..... | 105 | North Carolina..... | 47 | Connecticut..... | 30 |
| Septic sore throat..... | 3 | Wyoming..... | 7 | North Carolina..... | 9 |
| Whooping cough..... | 9 | Hookworm disease: | | Wyoming..... | 3 |
| | | Connecticut..... | 1 | Trichinosis: | |
| | | Lead poisoning: | | Connecticut..... | 2 |
| | | Connecticut..... | 1 | Typhus fever: | |
| March 1938 | | Mumps: | | North Carolina..... | 4 |
| Chickenpox: | | Connecticut..... | 1,419 | Undulant fever: | |
| Connecticut..... | 870 | Delaware..... | 213 | Connecticut..... | 10 |
| Delaware..... | 75 | West Virginia..... | 7 | Delaware..... | 1 |
| District of Columbia..... | 304 | Wyoming..... | 50 | West Virginia..... | 2 |
| North Carolina..... | 1,433 | Ophthalmia neonatorum: | | Whooping cough: | |
| West Virginia..... | 222 | Connecticut..... | 1 | Connecticut..... | 274 |
| Wyoming..... | 123 | Delaware..... | 2 | Delaware..... | 30 |
| Conjunctivitis, infectious: | | North Carolina..... | 2 | District of Columbia..... | 34 |
| Connecticut..... | 2 | Paratyphoid fever: | | North Carolina..... | 2,074 |
| Encephalitis, epidemic or | | Connecticut..... | 2 | West Virginia..... | 215 |
| lethargy: | | North Carolina..... | 1 | Wyoming..... | 91 |
| Connecticut..... | 2 | | | | |
| West Virginia..... | 2 | | | | |

PLAQUE INFECTION IN ADAMS AND LINCOLN COUNTIES, WASH.

Under date of April 11 plague infection was reported proved, by animal inoculation, in 2 lots of fleas, as follows: 1 lot of 252 fleas taken from 24 ground squirrels, *Citellus townsendii*, shot on March 30, 1938, 2 miles southeast of Lind, Adams County, Wash., and the other a lot of 94 fleas from 11 squirrels of the same species shot on the same day on the east side of the town limits of Lind.

On April 14 plague infection was reported proved, by mass inoculation, in tissue from two ground squirrels, *Citellus townsendii*, taken April 6, 1938, in Lincoln County, Wash., 13 miles north of Ritzville.

WEEKLY REPORTS FROM CITIES

City reports for week ended Apr. 2, 1938

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table.

| State and city | Diphtheria cases | Influenza | | Measles cases | Pneumonia deaths | Scarlet fever cases | Small-pox cases | Tuberculosis deaths | Typhoid fever cases | Whooping cough cases | Deaths, all causes |
|---|------------------|-----------|--------|---------------|------------------|---------------------|-----------------|---------------------|---------------------|----------------------|--------------------|
| | | Cases | Deaths | | | | | | | | |
| Data for 90 cities: 5-year average-- | 189 | 386 | 101 | 7,213 | 881 | 2,639 | 26 | 407 | 21 | 1,414 | ----- |
| Current week-- | 102 | 129 | 47 | 13,769 | 711 | 1,919 | 24 | 377 | 18 | 1,284 | ----- |
| Maine: | | | | | | | | | | | |
| Portland | 0 | 1 | 0 | 12 | 2 | 1 | 0 | 0 | 1 | 35 | 24 |
| New Hampshire: | | | | | | | | | | | |
| Concord | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Manchester | 0 | 0 | 0 | 5 | 12 | 0 | 0 | 0 | 0 | 0 | 27 |
| Nashua | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 14 |
| Vermont: | | | | | | | | | | | |
| Barre | 0 | 0 | 23 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 3 |
| Burlington | 0 | 0 | 8 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 12 |
| Rutland | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Massachusetts: | | | | | | | | | | | |
| Boston | 0 | 1 | 225 | 39 | 136 | 0 | 11 | 1 | 31 | 226 | |
| Fall River | 0 | 0 | 3 | 2 | 0 | 0 | 2 | 0 | 1 | 1 | 37 |
| Springfield | 0 | 0 | 10 | 4 | 3 | 0 | 1 | 0 | 13 | 22 | |
| Worcester | 0 | 0 | 1 | 5 | 13 | 0 | 1 | 0 | 2 | 41 | |
| Rhode Island: | | | | | | | | | | | |
| Pawtucket | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 10 |
| Providence ¹ | 10 | 0 | 0 | 5 | 17 | 0 | 4 | 0 | 30 | 66 | |
| Connecticut: | | | | | | | | | | | |
| Bridgeport | 0 | 0 | 2 | 2 | 31 | 0 | 1 | 0 | 0 | 0 | 39 |
| Hartford | 0 | 0 | 0 | 8 | 31 | 0 | 1 | 0 | 2 | 46 | |
| New Haven | 0 | 0 | 6 | 2 | 2 | 0 | 1 | 0 | 20 | 37 | |
| New York: | | | | | | | | | | | |
| Buffalo | 0 | 1 | 2 | 11 | 70 | 0 | 5 | 0 | 9 | 161 | |
| New York | 19 | 13 | 7 | 1,836 | 152 | 413 | 0 | 90 | 3 | 213 | 1,529 |
| Rochester | 0 | 3 | 0 | 8 | 6 | 28 | 0 | 5 | 0 | 4 | 75 |
| Syracuse | 1 | 0 | 24 | 5 | 10 | 0 | 2 | 0 | 12 | 45 | |
| New Jersey: | | | | | | | | | | | |
| Camden | 0 | 0 | 56 | 6 | 3 | 0 | 0 | 0 | 5 | 38 | |
| Newark | 0 | 0 | 14 | 15 | 9 | 0 | 6 | 0 | 37 | 111 | |
| Trenton | 0 | 1 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 32 |
| Pennsylvania: | | | | | | | | | | | |
| Philadelphia | 1 | 2 | 2 | 970 | 39 | 133 | 0 | 15 | 0 | 52 | 478 |
| Pittsburgh | 2 | 5 | 3 | 158 | 17 | 41 | 0 | 10 | 0 | 14 | 166 |
| Reading | 0 | 1 | 1 | 13 | 3 | 4 | 0 | 1 | 0 | 3 | 20 |
| Scranton | 1 | 0 | 73 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | ----- |
| Ohio: | | | | | | | | | | | |
| Cincinnati | 5 | 3 | 3 | 6 | 13 | 14 | 0 | 12 | 0 | 7 | 132 |
| Cleveland | 0 | 14 | 0 | 450 | 26 | 67 | 0 | 12 | 0 | 71 | 203 |
| Columbus | 2 | 2 | 0 | 472 | 1 | 4 | 10 | 0 | 0 | 4 | 77 |
| Toledo | 0 | 0 | 168 | 4 | 13 | 0 | 1 | 0 | 0 | 8 | 77 |
| Indiana: | | | | | | | | | | | |
| Anderson | 0 | 0 | 128 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 12 |
| Fort Wayne | 0 | 1 | 113 | 3 | 5 | 0 | 0 | 0 | 0 | 1 | 27 |
| Indianapolis | 1 | 0 | 310 | 10 | 25 | 1 | 1 | 0 | 3 | 102 | |
| Muncie | 0 | 0 | 10 | 2 | 0 | 28 | 0 | 0 | 0 | 0 | 16 |
| South Bend | 0 | 0 | 23 | 1 | 2 | 0 | 0 | 0 | 0 | 4 | 11 |
| Terre Haute | 0 | 0 | 23 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 21 |
| Illinois: | | | | | | | | | | | |
| Alton | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 12 |
| Chicago | 14 | 3 | 3 | 2,452 | 44 | 232 | 0 | 44 | 0 | 49 | 657 |
| Elgin | 0 | 0 | 1 | 1 | 6 | 0 | 0 | 0 | 0 | 2 | 7 |
| Moline | 0 | 0 | 39 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 7 |
| Springfield | 0 | 1 | 0 | 218 | 2 | 3 | 0 | 0 | 0 | 0 | 22 |
| Michigan: | | | | | | | | | | | |
| Detroit | 2 | 2 | 4 | 2,382 | 21 | 178 | 0 | 16 | 0 | 84 | 220 |
| Flint | 2 | 0 | 35 | 3 | 58 | 0 | 1 | 0 | 0 | 18 | 32 |
| Grand Rapids | 0 | 0 | 119 | 3 | 12 | 0 | 1 | 0 | 0 | 2 | 27 |

¹ The report of 20 cases of diphtheria in Providence, R. I., during the week ended March 12, 1938 (Public Health Reports, April 1, p. 512), was an error. These were cases of scarlet fever. Dr. M. J. Nestor, in writing to correct his report, states that "Providence is proud of its record of no case of diphtheria since November 6, 1937."

City reports for week ended Apr. 2, 1938—Continued

| State and city | Diph- theria cases | Influenza | | Meas- sles cases | Pneu- monia deaths | Scar- let fever cases | Small- pox cases | Tuber- culosis deaths | Ty- phoid fever cases | Whoop- ing cough cases | Deaths, all causes |
|----------------------------|--------------------------|-----------|--------|------------------------|--------------------------|--------------------------------|------------------------|-----------------------------|--------------------------------|---------------------------------|--------------------------|
| | | Cases | Deaths | | | | | | | | |
| Wisconsin: | | | | | | | | | | | |
| Kenosha | 0 | 0 | 0 | 96 | 0 | 8 | 0 | 0 | 0 | 0 | 4 |
| Madison | 0 | 0 | 0 | 47 | 1 | 3 | 0 | 0 | 0 | 13 | 18 |
| Milwaukee | 2 | 1 | 1 | 1,226 | 4 | 14 | 0 | 4 | 0 | 57 | 97 |
| Racine | 0 | 0 | 0 | 229 | 1 | 7 | 0 | 1 | 0 | 24 | 12 |
| Superior | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Minnesota: | | | | | | | | | | | |
| Duluth | 0 | 0 | 0 | 5 | 2 | 2 | 0 | 1 | 2 | 8 | 16 |
| Minneapolis | 1 | 0 | 0 | 134 | 6 | 27 | 0 | 0 | 0 | 1 | 90 |
| St. Paul | 1 | 0 | 0 | 1 | 6 | 7 | 2 | 0 | 0 | 0 | 57 |
| Iowa: | | | | | | | | | | | |
| Cedar Rapids | 0 | 0 | 0 | 2 | 4 | 1 | 0 | 1 | 4 | 0 | — |
| Davenport | 0 | 0 | 0 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | — |
| Des Moines | 0 | 0 | 0 | 21 | 0 | 26 | 4 | 0 | 0 | 0 | 28 |
| Sioux City | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 5 | — |
| Waterloo | 1 | 0 | 0 | 113 | 0 | 2 | 0 | 0 | 0 | 0 | — |
| Missouri: | | | | | | | | | | | |
| Kansas City | 0 | 0 | 0 | 149 | 6 | 14 | 0 | 5 | 0 | 0 | 89 |
| St. Joseph | 0 | 0 | 0 | 35 | 4 | 1 | 0 | 1 | 0 | 0 | 23 |
| St. Louis | 9 | 1 | 0 | 16 | 12 | 79 | 3 | 4 | 0 | 4 | 234 |
| North Dakota: | | | | | | | | | | | |
| Fargo | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 3 |
| Grand Forks | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 0 | 0 | 0 | — |
| Minot | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| South Dakota: | | | | | | | | | | | |
| Aberdeen | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 8 | — |
| Sioux Falls | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| Nebraska: | | | | | | | | | | | |
| Omaha | 0 | 0 | 0 | 57 | 13 | 0 | 0 | 0 | 0 | 0 | 71 |
| Kansas: | | | | | | | | | | | |
| Lawrence | 0 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 1 | 1 | 12 |
| Topeka | 0 | 0 | 1 | 75 | 2 | 4 | 0 | 0 | 0 | 15 | 17 |
| Wichita | 0 | 1 | 1 | 6 | 10 | 5 | 0 | 0 | 0 | 1 | 31 |
| Delaware: | | | | | | | | | | | |
| Wilmington | 0 | 0 | 0 | 10 | 5 | 3 | 0 | 0 | 0 | 3 | 18 |
| Maryland: | | | | | | | | | | | |
| Baltimore | 2 | 5 | 1 | 19 | 22 | 36 | 0 | 11 | 0 | 49 | 229 |
| Cumberland | 0 | 0 | 0 | 3 | 1 | 3 | 0 | 0 | 0 | 0 | 14 |
| Frederick | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 |
| District of Colum- bia: | | | | | | | | | | | |
| Washington | 5 | 3 | 1 | 17 | 14 | 18 | 0 | 9 | 0 | 14 | 162 |
| Virginia: | | | | | | | | | | | |
| Lynchburg | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 11 |
| Norfolk | 0 | 3 | 0 | 54 | 3 | 8 | 0 | 1 | 2 | 17 | 26 |
| Richmond | 0 | 0 | 0 | 121 | 2 | 4 | 0 | 4 | 1 | 0 | 58 |
| Roanoke | 2 | 0 | 0 | 0 | 1 | 2 | 0 | 2 | 2 | 8 | 16 |
| West Virginia: | | | | | | | | | | | |
| Charleston | 0 | 0 | 0 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 11 |
| Huntington | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | — |
| Wheeling | 0 | 0 | 0 | 216 | 1 | 1 | 0 | 0 | 0 | 12 | 24 |
| North Carolina: | | | | | | | | | | | |
| Gastonia | 0 | 0 | 0 | 37 | 0 | 0 | 0 | 0 | 0 | 10 | — |
| Raleigh | 0 | 0 | 0 | 138 | 5 | 0 | 0 | 0 | 0 | 7 | 18 |
| Wilmington | 0 | 0 | 0 | 190 | 1 | 1 | 0 | 0 | 0 | 21 | 13 |
| Winston-Salem | 0 | 0 | 0 | 17 | 2 | 2 | 0 | 0 | 1 | 36 | 14 |
| South Carolina: | | | | | | | | | | | |
| Charleston | 0 | 30 | 0 | 17 | 3 | 0 | 0 | 1 | 1 | 1 | 20 |
| Florence | 0 | 0 | 0 | 10 | 2 | 0 | 0 | 0 | 0 | 0 | 13 |
| Greenville | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | — |
| Georgia: | | | | | | | | | | | |
| Atlanta | 1 | 6 | 1 | 44 | 9 | 2 | 0 | 8 | 0 | 4 | 70 |
| Brunswick | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 4 | 4 |
| Savannah | 0 | 5 | 0 | 136 | 1 | 0 | 0 | 1 | 0 | 1 | 27 |
| Florida: | | | | | | | | | | | |
| Miami | 3 | 103 | 1 | 1 | 0 | 0 | 0 | 3 | 2 | 0 | 40 |
| Tampa | 4 | 1 | 1 | 12 | 2 | 1 | 0 | 1 | 0 | 1 | 21 |
| Kentucky: | | | | | | | | | | | |
| Ashtabula | 0 | 0 | 0 | 2 | 8 | 0 | 0 | 0 | 1 | 2 | 21 |
| Lexington | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 5 | 21 |
| Louisville | 7 | 6 | 2 | 298 | 7 | 51 | 0 | 4 | 1 | 17 | 78 |
| Tennessee: | | | | | | | | | | | |
| Knoxville | 1 | 0 | 1 | 53 | 2 | 1 | 0 | 1 | 0 | 0 | 31 |
| Memphis | 0 | 0 | 1 | 17 | 8 | 2 | 1 | 7 | 0 | 0 | 76 |
| Nashville | 0 | 0 | 1 | 74 | 6 | 5 | 0 | 1 | 0 | 0 | 43 |

April 22, 1938

City reports for week ended Apr. 2, 1938—Continued

| State and city | Diphtheria cases | Influenza | | Measles cases | Pneumonia deaths | Scarlet fever cases | Small-pox cases | Tuberculosis deaths | Typhoid fever cases | Whooping cough cases | Deaths, all causes |
|------------------|------------------|-----------|--------|---------------|------------------|---------------------|-----------------|---------------------|---------------------|----------------------|--------------------|
| | | Cases | Deaths | | | | | | | | |
| Alabama: | | | | | | | | | | | |
| Birmingham | 0 | 8 | 0 | 55 | 4 | 0 | 0 | 6 | 0 | 0 | 50 |
| Mobile | 0 | | 2 | 26 | 1 | 0 | 0 | 2 | 0 | 0 | 27 |
| Montgomery | 0 | | | 78 | | 0 | 0 | | 1 | 0 | |
| Arkansas: | | | | | | | | | | | |
| Fort Smith | 0 | | | 2 | | 0 | 0 | | 0 | 1 | |
| Little Rock | 0 | | 0 | 28 | 5 | 0 | 0 | 0 | 0 | 2 | 5 |
| Louisiana: | | | | | | | | | | | |
| Lake Charles | 1 | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| New Orleans | 8 | 3 | 3 | 1 | 11 | 1 | 0 | 11 | 5 | 21 | 134 |
| Shreveport | 0 | | 0 | 3 | 6 | 3 | 0 | 5 | 0 | 0 | 40 |
| Oklahoma: | | | | | | | | | | | |
| Muskogee | 0 | | | 0 | | 1 | 0 | | 0 | 3 | |
| Oklahoma City | 0 | | 0 | 2 | 6 | 1 | 0 | 2 | 0 | 0 | 47 |
| Tulsa | 0 | | | 63 | | 3 | 2 | | 0 | 0 | |
| Texas: | | | | | | | | | | | |
| Dallas | 1 | | 0 | 3 | 9 | 11 | 0 | 3 | 0 | 6 | 71 |
| Fort Worth | 0 | | 0 | 0 | 4 | 3 | 0 | 3 | 0 | 1 | 36 |
| Galveston | 0 | | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 17 |
| Houston | 1 | | 1 | 2 | 7 | 2 | 2 | 10 | 1 | 0 | 95 |
| San Antonio | 1 | | 1 | 0 | 5 | 0 | 0 | 5 | 0 | 4 | 62 |
| Montana: | | | | | | | | | | | |
| Billings | 0 | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 5 |
| Great Falls | 0 | | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 10 | 3 |
| Helena | 0 | | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 5 |
| Missoula | 0 | | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 |
| Idaho: | | | | | | | | | | | |
| Boise | 0 | | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 4 |
| Colorado: | | | | | | | | | | | |
| Colorado Springs | 0 | | 0 | 0 | 1 | 0 | 3 | 3 | 0 | 0 | 13 |
| Denver | 3 | 1 | 310 | 8 | 21 | 0 | 4 | 0 | 0 | 2 | 89 |
| Pueblo | 0 | | 0 | 1 | 3 | 1 | 0 | 1 | 0 | 5 | 21 |
| New Mexico: | | | | | | | | | | | |
| Albuquerque | 0 | | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 1 | 10 |
| Utah: | | | | | | | | | | | |
| Salt Lake City | 0 | | 0 | 265 | 1 | 7 | 0 | 1 | 0 | 14 | 26 |
| Washington: | | | | | | | | | | | |
| Seattle | 0 | | 0 | 0 | 3 | 3 | 1 | 2 | 0 | 65 | 104 |
| Spokane | 0 | 1 | 1 | 2 | 6 | 4 | 0 | 0 | 0 | 20 | 42 |
| Tacoma | 0 | | 0 | 0 | 5 | 7 | 2 | 0 | 0 | 5 | 38 |
| Oregon: | | | | | | | | | | | |
| Portland | 0 | 1 | 0 | 9 | 7 | 26 | 3 | 4 | 1 | 0 | 87 |
| Salem | 0 | 2 | | 0 | | 0 | 0 | | 0 | 0 | |
| California: | | | | | | | | | | | |
| Los Angeles | 11 | 13 | 1 | 16 | 13 | 37 | 0 | 14 | 0 | 29 | 344 |
| Sacramento | 0 | 3 | 2 | 2 | 2 | 2 | 0 | 2 | 0 | 39 | 32 |
| San Francisco | 0 | 2 | 0 | 4 | 9 | 18 | 0 | 5 | 0 | 51 | 191 |

| State and city | Meningococcus meningitis | | Polio-myelitis cases | State and city | Meningococcus meningitis | | Polio-myelitis cases |
|----------------|--------------------------|--------|----------------------|----------------|--------------------------|--------|----------------------|
| | Cases | Deaths | | | Cases | Deaths | |
| Vermont: | | | | | | | |
| Barre | 0 | 0 | 1 | | | | |
| Massachusetts: | | | | | | | |
| Boston | 2 | 0 | 0 | | | | |
| Connecticut: | | | | | | | |
| New Haven | 3 | 0 | 0 | | | | |
| New York: | | | | | | | |
| Buffalo | 0 | 2 | 0 | | | | |
| New York | 6 | 2 | 0 | | | | |
| Ohio: | | | | | | | |
| Cincinnati | 1 | 1 | 0 | | | | |
| Cleveland | 1 | 0 | 0 | | | | |
| Illinois: | | | | | | | |
| Chicago | 1 | 0 | 0 | | | | |

Encephalitis, epidemic or lethargic.—Cases: New York 4; Pittsburgh, 1; Milwaukee, 3; Kansas City, Mo., 2; New Orleans, 2; Oklahoma City, 1.

Pellagra.—Cases: Charleston, S. C., 1; Atlanta, 5; Savannah, 9; Dallas, 2; San Francisco, 1; Birmingham, 1.

Typhus fever.—Cases: Atlanta, 1; Houston, 1; Miami, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended March 12, 1938.—During the 2 weeks ended March 12, 1938, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

| Disease | Prince Edward Island | Nova Scotia | New Brunswick | Quebec | Ontario | Manitoba | Saskatchewan | Alberta | British Columbia | Total |
|--------------------------|----------------------|-------------|---------------|--------|---------|----------|--------------|---------|------------------|-------|
| Cerebrospinal meningitis | | | | | | | | | | 5 |
| Chickenpox | 8 | 19 | 300 | 543 | 113 | 69 | 11 | 298 | 1,451 | |
| Diphtheria | 17 | 2 | 68 | 19 | 3 | 6 | 2 | 2 | 117 | |
| Dysentery | | | | | 1 | | | | | 1 |
| Erysipelas | | | | 12 | 6 | 2 | | 3 | 2 | 25 |
| Influenza | 14 | | | 25 | 32 | 1 | 12 | | 48 | 132 |
| Lethargic encephalitis | | | | | 1 | | | | | 1 |
| Measles | 1 | 51 | 43 | 248 | 806 | 14 | 3 | 66 | 171 | 1,403 |
| Mumps | 25 | | 11 | | 375 | 304 | 7 | 25 | 53 | 830 |
| Paratyphoid fever | 1 | | | | 1 | | | | 1 | 3 |
| Pneumonia | 16 | | | | 83 | | 7 | | 27 | 133 |
| Poliomyelitis | 1 | | | | 1 | | | | | 2 |
| Scarlet fever | 43 | 5 | 194 | 243 | 60 | 56 | 81 | 84 | 766 | |
| Smallpox | 1 | | | | | | | | | 1 |
| Trachoma | | | | | | | | | | 4 |
| Tuberculosis | 3 | 22 | 20 | 109 | 113 | 6 | 1 | 2 | 38 | 314 |
| Typhoid fever | 3 | | 2 | 20 | 9 | | 1 | 2 | 1 | 38 |
| Undulant fever | | | | | 5 | | | | | 1 |
| Whooping cough | | | | 175 | 226 | 35 | 3 | | 77 | 516 |

¹ 2 weeks ended Mar. 16, 1938.

² Suspected.

CUBA

Provinces—Notifiable diseases—4 weeks ended March 5, 1938.—During the 4 weeks ended March 5, 1938, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

| Disease | Pinar del Rio | Habana | Matanzas | Santa Clara | Camaguey | Oriente | Total |
|-----------------------|---------------|--------|----------|-------------|----------|---------|-------|
| Cancer | 1 | 2 | 3 | 3 | | 6 | 15 |
| Chickenpox | 1 | 14 | 2 | 1 | 7 | | 25 |
| Diphtheria | 1 | 25 | 1 | 4 | 1 | | 32 |
| Dysentery (bacillary) | | | | 1 | | | 1 |
| Hookworm disease | | 1 | | | | | 1 |
| Leprosy | | 3 | | | | 7 | 10 |
| Malaria | 16 | 11 | 9 | 38 | 16 | 63 | 153 |
| Measles | 3 | 12 | 9 | 3 | | | 27 |
| Poliomyelitis | | 1 | | 1 | | 2 | 4 |
| Scarlet fever | | 3 | | | | | 3 |
| Tuberculosis | 40 | 33 | 26 | 39 | 15 | 56 | 189 |
| Typhoid fever | 9 | 126 | 4 | 31 | 3 | 46 | 219 |
| Whooping cough | | | | 1 | | | 1 |
| Yaws | | | | | | 7 | 7 |

April 22, 1938

CZECHOSLOVAKIA

Communicable diseases—December 1937.—During the month of December 1937, certain communicable diseases were reported in Czechoslovakia as follows:

| Disease | Cases | Deaths | Disease | Cases | Deaths |
|--------------------------|-------|--------|-------------------|-------|--------|
| Anthrax | 5 | 1 | Malaria | 49 | ----- |
| Cerebrospinal meningitis | 16 | 5 | Paratyphoid fever | 4 | ----- |
| Chickenpox | 308 | ----- | Poliomyelitis | 12 | 1 |
| Diphtheria | 4,907 | 214 | Puerperal fever | 27 | 8 |
| Dysentery | 51 | 12 | Scarlet fever | 2,555 | 25 |
| Influenza | 1,964 | 2 | Trachoma | 70 | ----- |
| Lethargic encephalitis | 1 | ----- | Typhoid fever | 559 | 62 |

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for March 25, 1938, pages 470-483. A similar cumulative table will appear in future issues of the PUBLIC HEALTH REPORTS for the last Friday of each month.

Cholera

India—Delhi.—During the week ended April 2, 1938, 1 case of cholera was reported in Delhi, India.

Indochina (French).—During the week ended April 2, 1938, 88 cases of cholera were reported in Tonkin Province, and 58 cases of the same disease were reported in Hanoi, French Indochina.

Plague

Bolivia.—Plague has been reported in Bolivia as follows: Chuquisaca Department, Tomina, February 21-28, 1938, 35 cases. Tarija Department, February 7-20, 1938, 3 cases. Santa Cruz Department, February 14-20, 1938, 1 case of pneumonic plague.

Egypt—Asyut Province—Mellaoui District.—During the week ended April 9, 1938, 1 case of pneumonic plague was reported in Mellaoui District, Asyut Province, Egypt.

Hawaii Territory—Island of Hawaii—Hamakua District.—A rat found on March 9, and one rat found on April 1, 1938, in Paauhau Sector, and one rat found on March 29, and another rat found on March 30, 1938, in Kukaiau, all in Hamakua District, Island of Hawaii, Hawaii Territory, have been proved positive for plague.

United States—Washington.—A report of plague infection in fleas and ground squirrels in Adams and Lincoln Counties, Wash., appears on page 638 of this issue of the PUBLIC HEALTH REPORTS.

Smallpox

Great Britain—England and Wales.—During the week ended March 26, 1938, 1 case of smallpox was reported in Kent County, and 1 case of smallpox was reported in the Port of London, England.

Typhus Fever

Bolivia.—During the period January 3 to February 28, 1938, typhus fever was reported in Bolivia as follows: La Paz, La Paz Department, 18 cases; Oruro, Oruro Department, 9 cases; Potosi, Potosi Department, 5 cases.

Yellow Fever

Brazil.—Yellow fever has been reported in Brazil as follows: Minas Geraes State, February 28 to March 12, 1938, 18 deaths; Rio de Janeiro State, February 21 to March 14, 1938, 7 deaths; Santa Catharina State, March 2, 1938, 1 death; Sao Paulo State, December 28, 1937, 1 death, January 14 to February 17, 1938, 4 cases, and 1 death.